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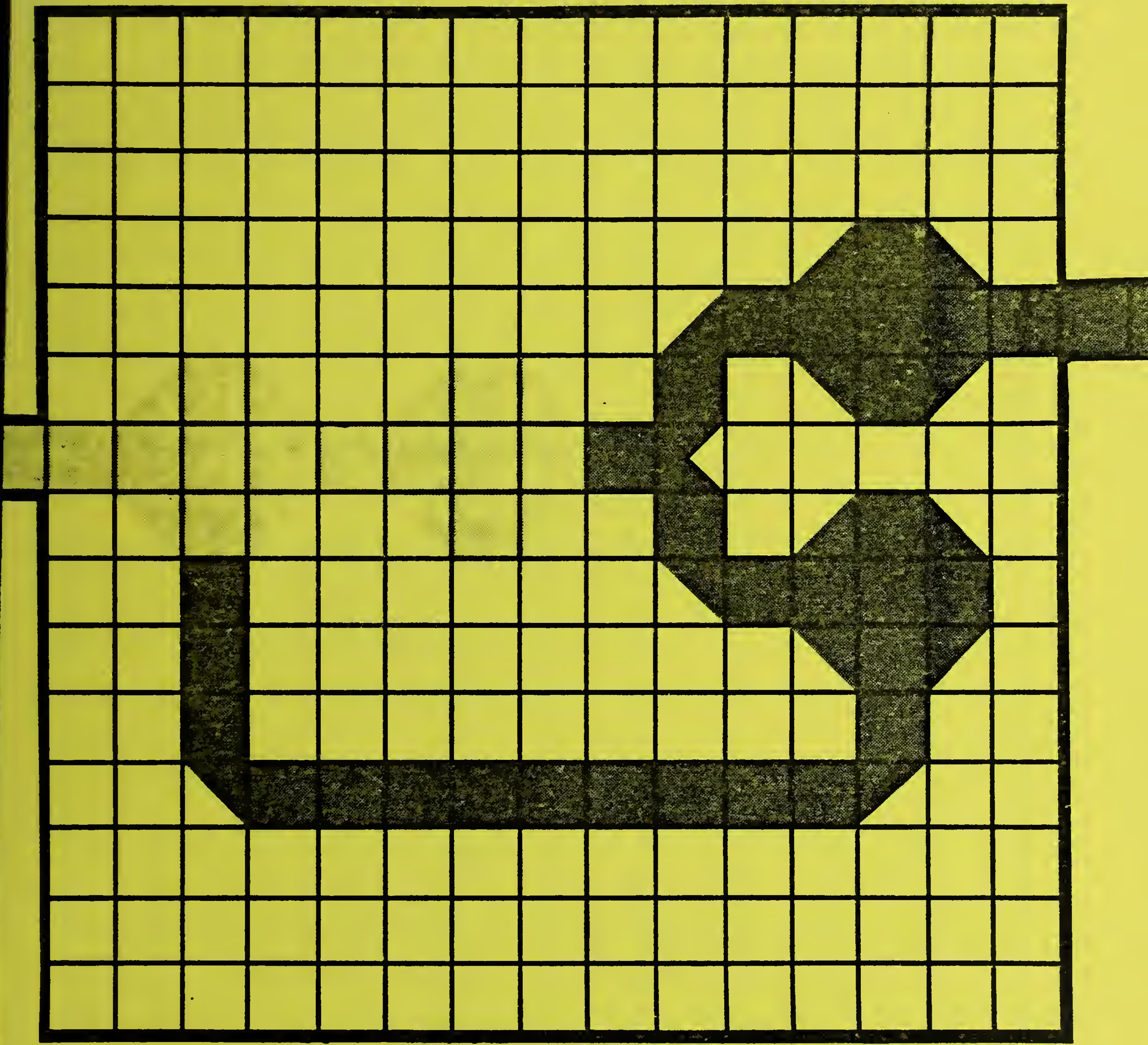
An Evaluation of the Technical Potential for Cogeneration in Illinois



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**** ADDENDUM ****

Since publication of this document, the Department of Energy and Natural Resources has recieved several additional responses to the cogeneration survey. An evaluation of the technical potential for these respondents found an additional 105.57 MW of cogeneration potential, which includes 21.69 MW of coal-fired.

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DOC. RE-AQ-86/01
January 1986

COGENERATION MARKET ASSESSMENT

AN EVALUATION OF THE TECHNICAL POTENTIAL FOR COGENERATION IN ILLINOIS

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[1] Prepared under contract AQ-24 with the Illinois Department of Energy and Natural Resources, 325 W. Adams, Springfield, Illinois 62704-1892 as project number 85/3109 to the Synergic Resources Corporation, 555 City Line Avenue, Bala Cynwyd, Pennsylvania 19004-1105

NOTE

This report has been reviewed by the Department of Energy and Natural Resources (ENR) and approved for publication.

Printed by the Authority of the State of Illinois

Date Printed: January 1986

Quantity Printed: 300

Illinois Department of Energy and Natural Resources
Energy and Environmental Affairs Division
325 West Adams Street
Springfield, Illinois 62704-1892
(217) 785-2800

EXECUTIVE SUMMARY

Today, cogeneration has become an increasingly important part of the Illinois energy economy. Cogeneration provides manufacturing industries with a means to decrease operating costs, and the oil, natural gas and coal industries with a means to increase their market shares. At the same time, cogeneration also creates competition for the electric utilities, and is changing the way that we view the structure of the electric utility industry.

The Department of Energy and Natural Resources is responsible for promoting the efficient use of energy resources and recognizes the growth of economical cogeneration technology as a means to achieve this as well as the promotion of Illinois coal as a source of energy. The Department has designed a market assessment study of cogeneration in Illinois to identify and understand the effects of increased use of cogeneration. This report is the second part of the three part market assessment. The purpose of the report is to present the results a survey designed to provide detailed information about existing cogeneration and the technical potential for industrial cogneration in Illinois. Specifically, the survey report contains information on the amounts and types of existing cogeneration; a sample of the industrial technical potential for cogeneration by utility territory and by technology; industries'attitude towards cogeneration, and finally, a sample of industries' economic requirements for a feasible cogeneration project.

The results presented in this survey were taken from 184 surveys that were returned from the original sample of 473 plants. This translates into a 37% response rate. Of these 184 plants, 154 were evaluated for technical potential and 30 were identified as cogenerators. The evaluation of these plants found 369 MW of existing cogeneration and 2854 MW of technically feasible cogeneration (including 254 MW of coal-fired cogeneration). Although the technical potential estimate is relatively low, it is based on a relatively small group of respondents. Total statewide potential could be expected to be considerably higher. The results also show that the potential for cogeneration is concentrated in the Commonwealth Edison Co. and Illinois Power service territories.

Included in the survey were questions designed to determine industries' attitudes towards cogeneration; in particular towards coal-cogeneration. The survey shows that many industries have no incentive to get involved in the electricity production business and would prefer to stay on the electric utility grid. This attitude, however, seems to be a result of the reletively low buyback rates offered to cogenerated energy.

The development of the project was a combined effort of the Illinois Energy and Natural Resources Reasech and Planning Section and Synergic Resources Corporation of Bala Cynwyd, Penns.. The final phase of the Departments market assessment of cogeneration will be a study the economic potential of cogeneration in Illinois and its impact on the utility grid.

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I. INTRODUCTION AND SUMMARY

I. INTRODUCTION AND SUMMARY

A. BACKGROUND

This report summarizes the results of an assessment of the technical potential for cogeneration in the industrial sector of the state of Illinois. Information was gathered through the use of direct mail and telephone surveys to develop inputs to a cogeneration assessment model. This model strictly evaluates the technical characteristics, and feasibility of potential sites. The economic feasibility analysis is to be evaluated in subsequent studies.

B. OBJECTIVES AND SCOPE

The two objectives established for this project were to:

- Compile a listing of the known cogenerators in Illinois
- Identify the technical potential for industrial cogeneration with a capacity in excess of 1 MW.

Particular emphasis was placed on identifying the potential for cogenerators to utilize coal as the fuel source.

C. SUMMARY OF RESULTS

The cogeneration inventory identified eighty sites as potential cogenerators. Potential cogenerators were defined as sites identified in various sources as operating, planning or investigating cogeneration systems. Each site was contacted to confirm the status of their project. The results were as follows:

- Thirty sites were confirmed as operating cogeneration systems with a combined total capacity of 425 MW
- Seven sites were identified which produced electrical power only
- Twenty-seven sites were planning to expand or install cogeneration systems with a combined total capacity of 124 MW
- Three sites could not be contacted
- Three sites were permanently closed.

One hundred fifty four plants were evaluated for technical potential to cogenerate. Of these, forty one sites were determined to be too small for cogeneration. The remaining plants were classified as having low, medium, or high potential. Figure I-1 shows the distribution of sites by their potential classification.

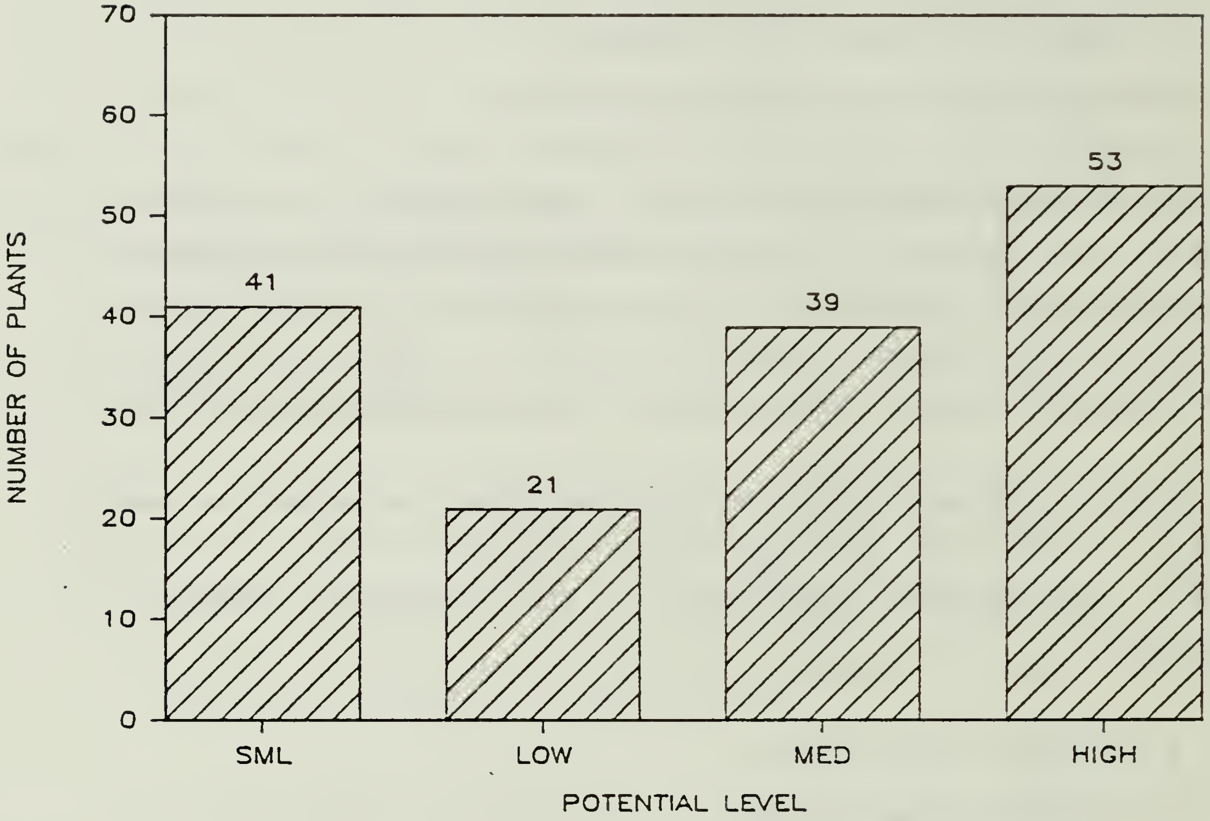
Four different cogeneration systems were evaluated for every plant. In each case, the cogeneration system was sized to meet the plant's peak thermal requirements. The following systems were examined:

- Gas-fired steam turbine
- Coal-fired steam turbine
- Combustion turbine
- Steam turbine/combustion turbine combined cycle.

The capacity estimates for each of the four systems by potential class are presented in Table I-1. Also provided are the peak electrical demand, the minimum cogeneration capacity and the maximum cogeneration capacity by potential class. The minimum cogeneration capacity was calculated by summarizing the minimum, for each plant, of the four cogeneration systems and the plant's peak electrical demand. The plant's peak electrical demand was included since some plants may

Figure I-1

NUMBER OF PLANTS BY POTENTIAL CLASSIFICATION



LEGEND

SML - Plants too small to support 1MW gas turbine.

LOW - Potential score between 30 - 60% inclusive.

MED - Potential score between 61 - 75% inclusive.

HIGH - Potential score above 75%.

Table I-1

SUMMARY OF COGENERATION CAPACITY BY TECHNOLOGY AND POTENTIAL LEVEL

Potential	Gas-Fired Steam Turbine (MW)	Coal-Fired Steam Turbine (MW)	Combustion Turbine (MW)	Combined Cycle (MW)	Peak Electrical Load (MW)	Minimum Cogeneration Capacity (MW)	Maximum Cogeneration Capacity (MW)
Low	30.16	23.41	110.02	160.09	62.48	33.61	186.70
Medium	127.53	42.46	387.88	641.41	379.10	106.48	777.42
High	346.24	188.30	992.48	1684.35	758.10	318.15	1889.83
Total	503.93	254.16	1490.38	2485.85	1199.68	458.24	2853.96

elect to install cogeneration systems which are sized to meet their peak electrical demand rather than their peak thermal demand. The maximum cogeneration capacity was calculated in a similar manner. This data is graphically portrayed in Figures I-2 through I-5.

D. ORGANIZATION OF THE REPORT

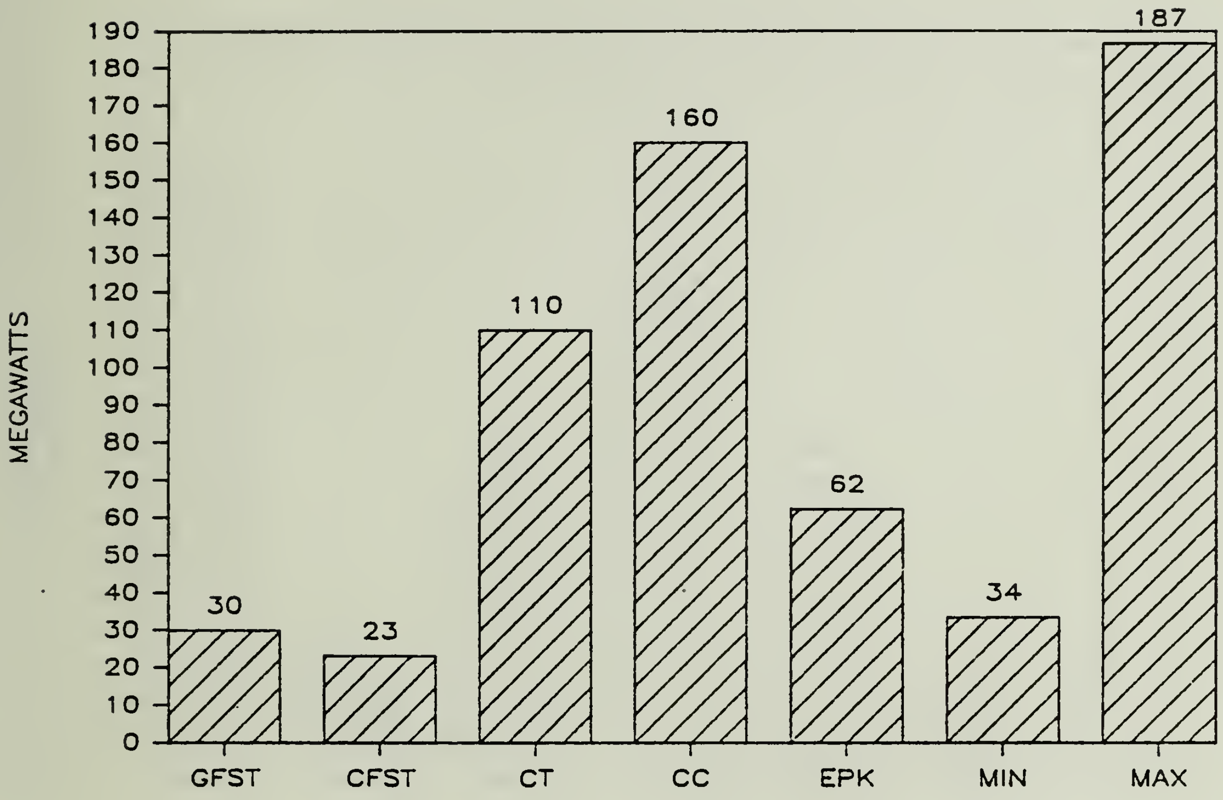
The report is comprised of four sections and several appendices. Section II details the methodology used to gather plant information and develop cogeneration potential estimates. Included is a discussion of the potential scoring methodology, the technologies evaluated and the computer model which assigns the potential scores and calculates the capacity estimates.

Results of the cogeneration inventory are presented in Section III. Section IV details the results of the potential scoring and capacity estimation.

A sample survey form, data entry codes, cogenerator inventory and the data base can be found in the appendicies.

Figure I-2

COGENERATION CAPACITY FOR LOW POTENTIAL PLANTS



LEGEND:

GFST - Gas-Fired Steam Turbine

CFST - Coal-Fired Steam Turbine

CT - Combustion Turbine

CC - Combined Cycle

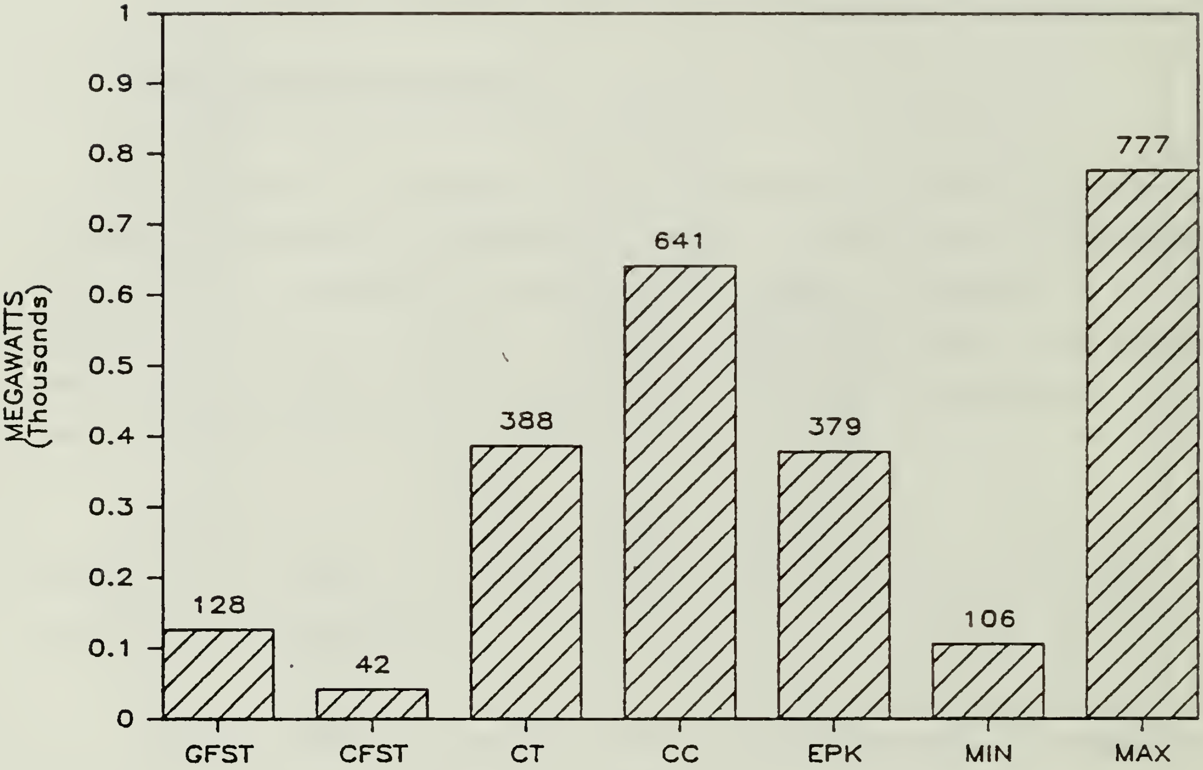
EPK - Peak Electrical Load

MIN - Minimum Cogeneration Capacity

MAX - Maximum Cogeneration Capacity

Figure I-3

COGENERATION CAPACITY FOR MEDIUM POTENTIAL PLANTS



LEGEND:

GFST - Gas-Fired Steam Turbine

CFST - Coal-Fired Steam Turbine

CT - Combustion Turbine

CC - Combined Cycle

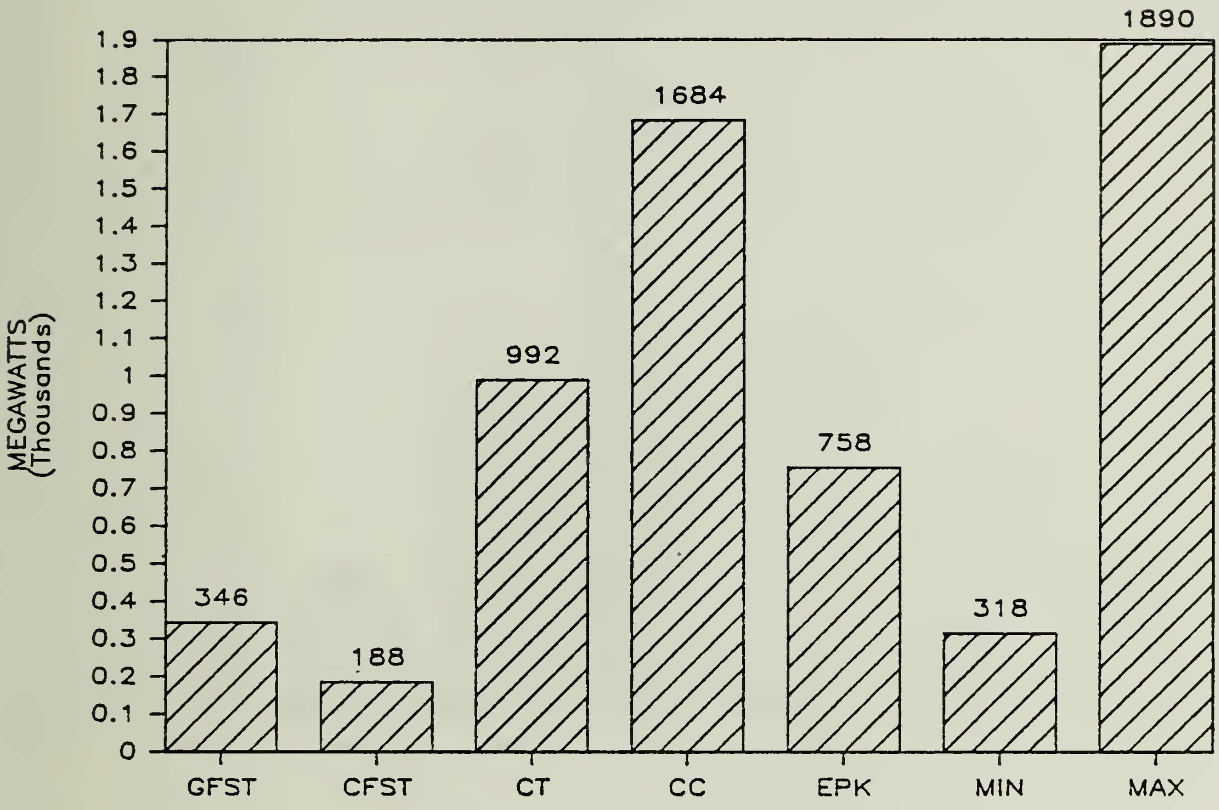
EPK - Peak Electrical Load

MIN - Minimum Cogeneration Capacity

MAX - Maximum Cogeneration Capacity

Figure I-4

COGENERATION CAPACITY FOR HIGH POTENTIAL PLANTS



LEGEND:

GFST - Gas-Fired Steam Turbine

CFST - Coal-Fired Steam Turbine

CT - Combustion Turbine

CC - Combined Cycle

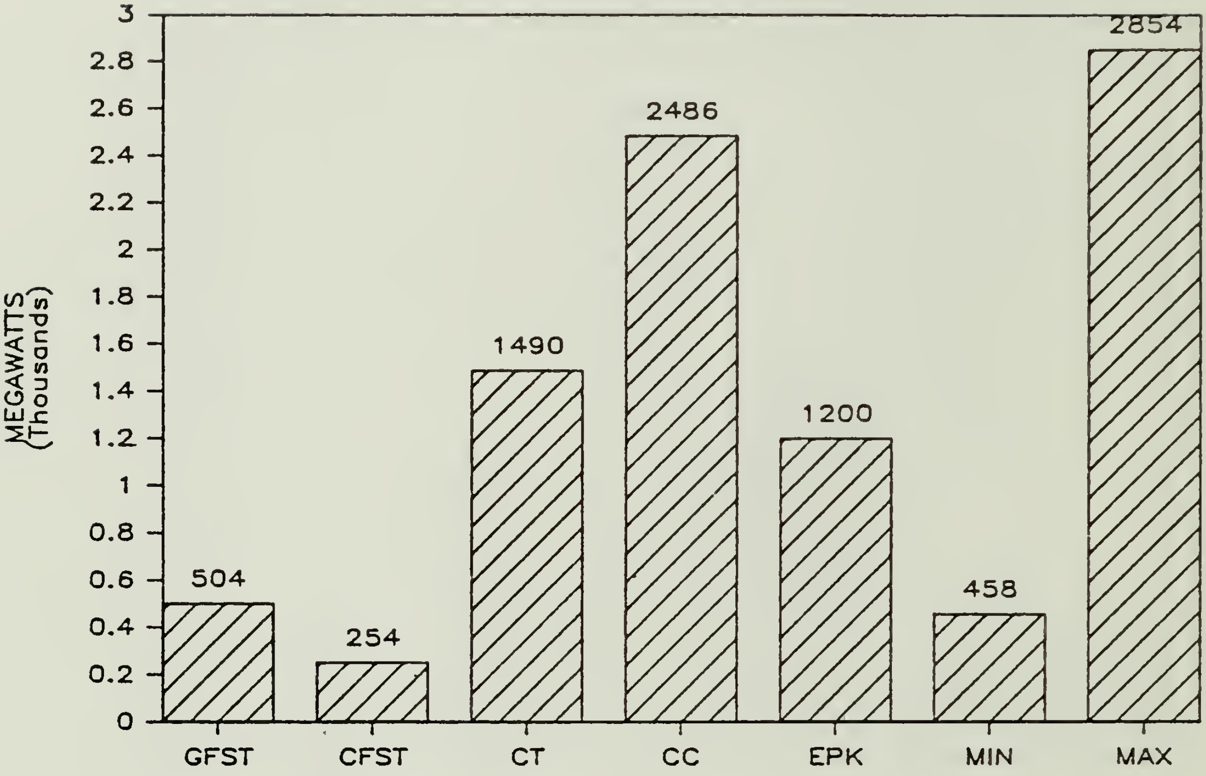
EPK - Peak Electrical Load

MIN - Minimum Cogeneration Capacity

MAX - Maximum Cogeneration Capacity

Figure I-5

TOTAL COGENERATION CAPACITY



LEGEND:

GFST - Gas-Fired Steam Turbine

CFST - Coal-Fired Steam Turbine

CT - Combustion Turbine

CC - Combined Cycle

EPK - Peak Electrical Load

MIN - Minimum Cogeneration Capacity

MAX - Maximum Cogeneration Capacity

II. METHODOLOGY

II. METHODOLOGY

A. INTRODUCTION

The project consisted of three major tasks which were to:

- Develop an inventory of existing cogeneration sites
- Survey industrial sites to identify plant operational characteristics
- Analyze plant data to determine the technical potential for cogeneration.

This section of the report describes the methodology used to complete these major tasks.

B. COGENERATION INVENTORY

Developing an inventory of existing cogenerators requires not only an identification of cogeneration sites, but also a confirmation of the status of those sites. Many sources were used to identify possible cogeneration sites including:

- FERC forms that indicate an intent to file for status as a Qualifying Facility (QF) and announcements of the granting of QF status
- Review of trade publications
- Reference to trade associations
- Review of cogeneration literature
- Contacts with architects, engineers, and industrial firms and associations.

These sources provided the possible cogeneration sites. However, experience has shown that some of these sites either never had a cogeneration system, shut the system down, closed the plant, generate electric power but not thermal energy, or only have peak shaving or emergency generation equipment. To prevent the inclusion of sites which do not cogenerate, each of the possible cogenerators was contacted either by phone or mail to confirm the status of their site.

Another source originally considered for use to identify cogenerators was direct contact with local gas and electric utilities. This source was not used at the request of ENR's Project Manager.

C. INDUSTRIAL SITE SURVEYS

A survey form was developed by SRC and approved by the ENR staff. The objective of the survey was to obtain sufficient primary data to perform an analysis of the site's technical cogeneration potential. Of particular interest was the plant's ability to burn coal. A copy of the survey form is provided in Appendix A.

A list of industrial plants to which the survey was mailed was provided by ENR. The source used in developing the list was the Illinois EPA Air Emissions Inventory with Modifications made by ENR. This listing provided plant address, contact, phone number and miscellaneous boiler data.

To improve the rate of survey responses telephone pre-screening calls were made. This was done to identify the person who had the authority and knowledge to complete the form. In addition to identifying the mail contact, the pre-screening calls acted as an introduction to the survey. The call informed the contact of the survey's purpose and alerted him to the fact that it would soon be mailed. The script used for prescreening is provided in Appendix A.

The response to a mail survey suffers from a number of problems. One of the problems is the "priority shuffle". While a recipient may be willing to complete the survey, he may not have all the information readily available or he may not have time. In either case, the form takes its place in the "Things to Do" bin where it may be lost for weeks or months. Another problem, especially for summertime surveys, is that of vacations. In this case the survey also finds its way to the "Things to Do" pile. To help overcome these problems two "reminder" calls were made at three and six weeks from the date of the initial mailing to those plants which had not responded.

Completed surveys were coded and compiled into a data base serving as input for the data analysis. Data entry codes can be found in Appendix B.

D. DATA ANALYSIS

The data was analyzed in two separate steps. First each plant was evaluated and assigned a potential score. This score is not an absolute scale, but rather a relative scale. A high score indicates a site which is technically better suited for cogeneration than a plant receiving a low score. The second part of the analysis was the matching of electrical power production to the sites' thermal or electrical characteristics to develop an estimate of the potential cogeneration capacity at the site. A computer model was developed which performs these two steps. A discussion of the methodology for rating potential, the cogeneration technologies and the computer model follows.

1. Potential Scoring

The calculation of a cogeneration potential score is based upon several plant characteristics. These characteristics provide an indication of the relative attractiveness of cogeneration, independent of the technology chosen. That is, a high potential score indicates that any type of cogeneration system is equally technically possible. It does not mean, however, that all technologies are equally practical. For instance, a plant may score high on potential but not have sufficient steam flow to support a steam turbine.

Ideally, the cogeneration potential score should be completely independent of plant size. In practice this is not possible. In an ideal situation two plants which have the same operating characteristics but different steam flows should have the same potential score. In reality, the plant with the larger steam flow is more likely to cogenerate because it has the ability to supply only a part of its thermal requirements via cogeneration.

The potential score is the product of two numbers, the Factor Score and the Factor Weight. The Factor Score rates the relative effect of variations within a plant characteristic. The Factor Weight rates the relative effect of the Factor Scores. To arrive at a potential score each Factor Score is multiplied by its respective Weight and the results are added to achieve a total score. The score is then converted to a percentage.

- **Factor Levels**

The characteristics used to arrive at a potential score included:

- operating hours
- level of steam demand
- daily electric load variations
- daily steam load variations
- seasonal electric load variations
- seasonal steam load variations

- availability of waste heat
- age of existing boilers.

Each of these characteristics is described below.

The fraction of steam demand required at various pressure levels was originally considered as a factor. After a test case was run, it was found that no variation in required pressure level existed for a sample of 34 plants. Although some plants will require steam pressures higher than 300 psig, and this would lower their cogeneration potential, the number of plants is very small and not considered significant in this analysis.

Operating Hours Factor Score. The hours of operation is one of the most important characteristics in determining the potential for cogeneration. This factor influences both technical and economical decisions. A plant which operates on a three shift per day basis is far more likely to be a cogenerator than one which operates on a one shift per day basis. This one factor can make the difference between a plant with a high potential and one with a low potential. Consequently, this factor requires the largest spread between the high and low levels to differentiate between plants. Table II-1 indicates the score assigned to the various combinations of operating hours.

Table II-1

OPERATING HOURS SCORES

SHIFTS/DAY	WEEKS/YEAR	SCORE
1	52	1
2	≤ 40	1
2	≥ 40	3
3	≤ 40	3
3	≥ 40	5

Steam Demand Factor Score. A minimum steam flow rate is required to produce 1 MW. A plant that requires this peak steam flow rate is a potential cogenerator. A plant with identical characteristics and 10 times the flow rate will have a higher potential to cogenerate. This larger plant is able to size the system to satisfy the plants total steam requirements or, more likely, to select a smaller system which is utilized more efficiently. The Steam Demand Factor accounts for the greater potential of larger plants due to their larger steam demand. Table II-2 presents the scores for various peak steam demand requirements.

Table II-2

PEAK STEAM DEMAND SCORES

PEAK STEAM DEMAND (1000 lbs/hour)	SCORE
0 - $\leq$10	1
10 - $\leq$40	2
40 - $\leq$80	3
$\geq$80	4

Electric and Steam Load Factor Level. Cogeneration systems perform best and are most easily designed when the system will operate in a steady-state mode. As variations in operating parameters increase complex control and sizing problems occur. The electric and steam load variations were examined on both a daily and seasonal basis. The scores for these variations are shown in Table II-3.

Table II-3

ELECTRIC AND STEAM LOAD VARIATION SCORES

ELECTRIC OR STEAM LOAD VARIATION	SCORE
Great Deal of Variation	1
Some Variation	2
Little or No Variation	3

Waste Heat Factor Score. Industry utilizes high quality heat in processes such as drying, heat treating and melting. Generally, such heat is provided by a furnace. The exhaust from the process may have sufficient heating value to generate steam in a waste heat boiler. During the energy crisis of the 1970s most of these waste heat streams were tapped for their heating value. Nonetheless, some plants still have available waste heat streams. The availability of a waste heat decreases a plant's potential for topping cycle cogeneration. This is because the changes necessary to install a bottoming cycle cogeneration system or heat recovery systems are less complicated and expensive than installing a topping cycle cogeneration system. While bottoming cycle potential does exist, its magnitude is relatively small as compared to topping cycle systems.

Table II-4 shows the scores assigned depending on the number of available waste heat streams. Those plants that have streams with temperatures greater than 400°F and which will not foul or clog heat exchangers received a score level based upon the number of such streams available.

Table II-4

WASTE HEAT AVAILABILITY SCORE

NUMBER OF STREAMS AVAILABLE	SCORE
3 or 4	1
1 or 2	2
0	3

The characteristics of the waste heat streams varied widely. Some streams were flue gases, others were product streams. In many cases either the flow rate or the composition of the stream was not accurately known. For these reasons no attempt was made to compare the quantity of heat available versus that provided by a topping cycle cogeneration system. Analysis of the benefits of utilizing available waste heat in a bottoming cycle cogeneration system versus installing a topping cycle is left to specific plant studies.

Boiler Age Factor Score. The age of the boilers used to provide plant steam requirements affects the potential for cogeneration by increasing the potential for plants which have older boilers. Sites which use older boilers are likely to replace the boilers to cut operating and maintenance costs. A cogeneration system installation requires a new boiler or a boiler upgrade. Therefore, a plant with old boilers would be more inclined to install a cogeneration system than a plant with new boilers. To evaluate this potential the average age of the boilers was calculated. The scores for boiler age is given in Table II-5.

Table II-5

BOILER AGE FACTOR SCORE

AVERAGE BOILER AGE (years)	SCORE
less than 10	1
10 - 20	2
greater than 20	3

- **Factor Weights**

Factor weights are used to rank the relative importance of the potential factors. The factor score is multiplied by its respective factor weight to achieve a potential score. The least significant factor is assigned a factor weight of one, the highest factor is assigned a weight of eight. As previously mentioned, the factor with the most weight is that of the plant's operating hours. Table II-6 lists the characteristics, factor scores, factor weights, lowest and highest weighted scores, and the characteristics percentage of total possible score. For analysis purposes, the scores for each plant were converted to a percentage.

2. Technology Choices

Given the goals of the project, the nature of the data collected and the minimum size limitation of 1 MW, technology options that were evaluated were limited to four different systems. All four systems were topping cycles since the potential for topping cycles as opposed to bottoming cycles is much greater. In any cogeneration system there are many configurations that are available. In each system only the most basic configuration was evaluated. To attempt any differentiation within systems would be misleading since the plant data is not specific enough to justify this type of analysis. The four cogeneration technologies which were sized included:

- backpressure steam turbine (coal and gas-fired)
- combustion turbine
- steam turbine/combustion turbine combined cycle.

• Backpressure Steam Turbine

A schematic diagram of a backpressure steam turbine is shown in Figure II-1. This system can be fired with most any fuel by modifying the boiler and flue gas clean-up systems. High pressure steam from the boiler is expanded in the steam turbine, which in turn drives the electrical generator. Steam exiting the turbine is used for process heating.

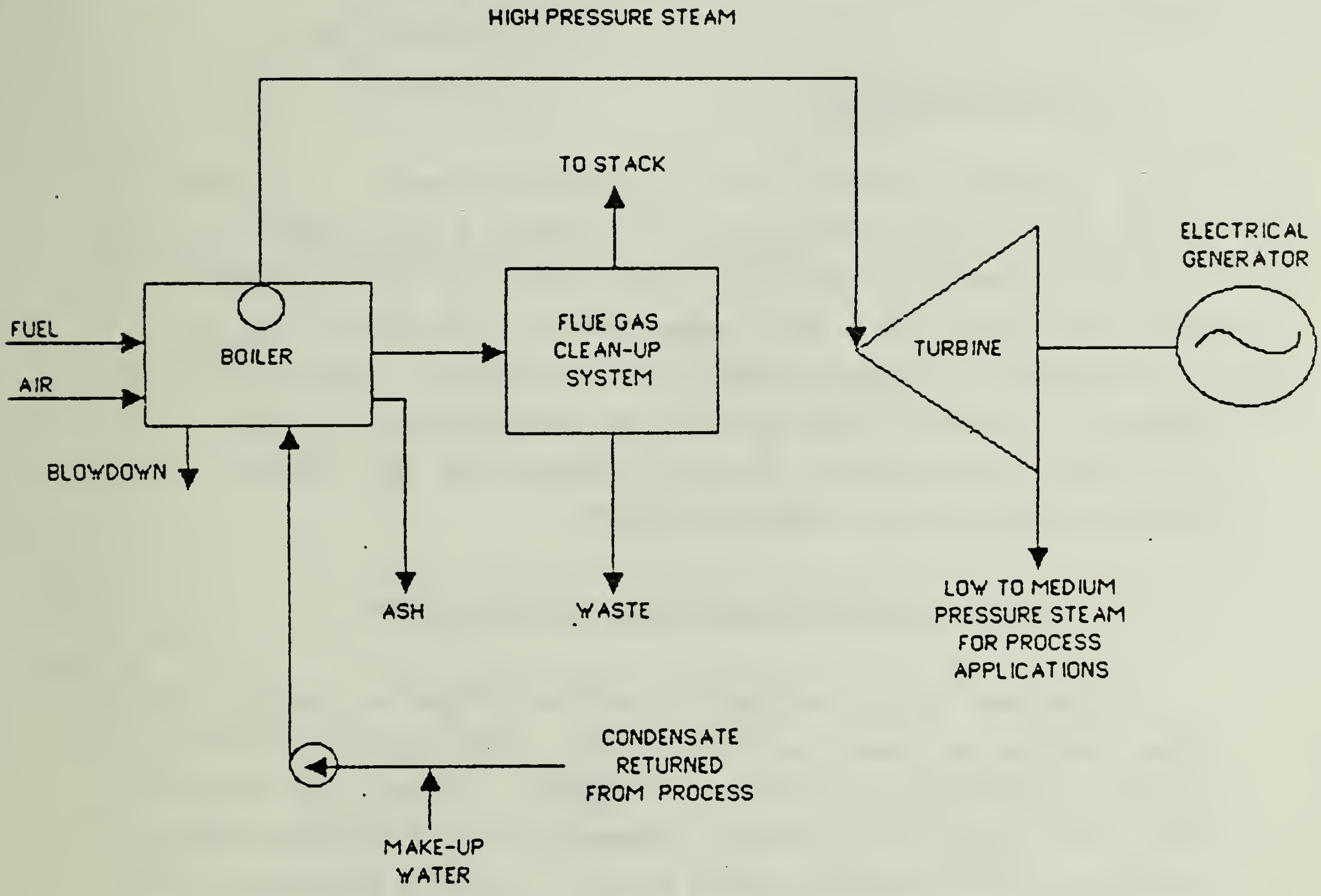
Table II-6

POTENTIAL CHARACTERISTICS RANKED BY HIGHEST POSSIBLE POTENTIAL SCORE

Potential Characteristic	Factor Levels	Factor Weight	Lowest Score	Highest Score	Characteristic's Percentage of Total Possible Score
Operating Hours	1,3,5	8	8	40	36.4
Daily Steam Load Variation	1,2,3	6	6	18	16.4
Level of Steam Demand	1,2,3,4	4	4	16	14.5
Daily Electric Load Variation	1,2,3	4	4	12	10.9
Seasonal Steam Load Variation	1,2,3	4	4	12	10.9
Seasonal Electric Load Variation	1,2,3	2	2	6	5.5
Availability of Waste Heat	1,2,3	1	1	3	2.7
Age of Boilers	1,2,3	1	1	3	2.7
		Total	30	110	100.0

Figure II-1

BACKPRESSURE STEAM TURBINE



The backpressure steam turbine is the simplest steam turbine system because it does not have heat rejection equipment (i.e., condensor). It is more efficient than other steam turbines because all of the thermal energy is delivered to the process. However, the electrical output is directly proportional to process heating requirements, thereby decreasing the ratio of electrical to thermal energy output.

- **Combustion Turbine**

A schematic diagram of a combustion turbine is shown in Figure II-2. This system, frequently called a gas turbine, can be fired with distillate fuels or natural gas. In this system air is compressed, heated to a high temperature by the addition of fuel in the combustor, and then expanded in the turbine. The energy of the expansion of gases is used to drive the compressor and generator. The hot turbine exhaust gases then pass through the heat recovery steam generator where process steam is produced.

- **Steam Turbine/Combustion Turbine Combined Cycle**

A combined cycle consists of both a combustion turbine and a steam turbine as shown in Figure II-3. This system provides the greatest flexibility in meeting a plant's thermal and electrical needs. The exhaust from the gas turbine is used to generate steam for the steam turbine and for process heating. Process steam can also be extracted from the steam turbine. The system's flexibility derives from the multiple process steam supply points. By diverting steam from the turbine or varying the rate of supplemental firing, changes in process steam demand can be met.

Figure II-2

COMBUSTION TURBINE

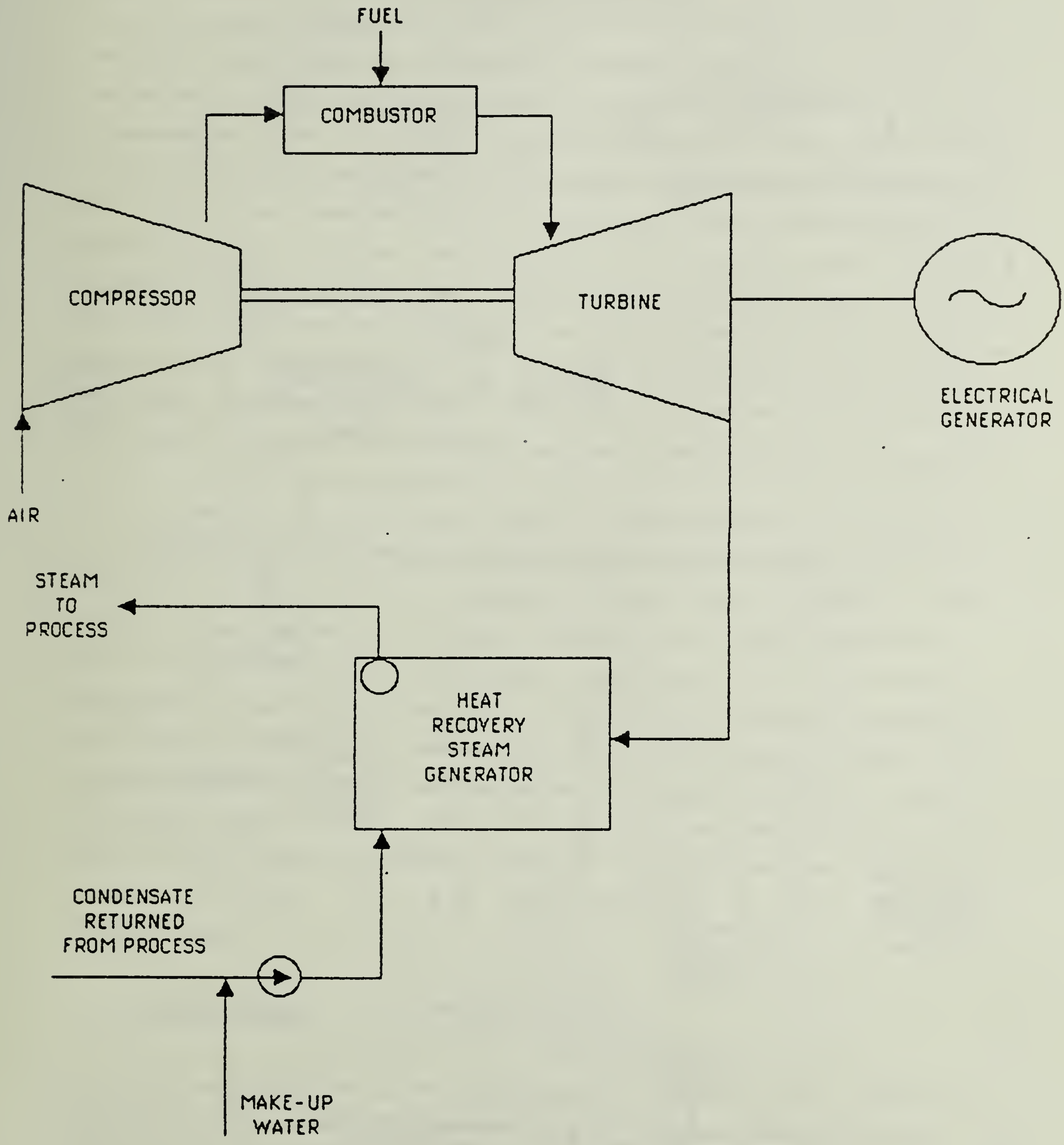
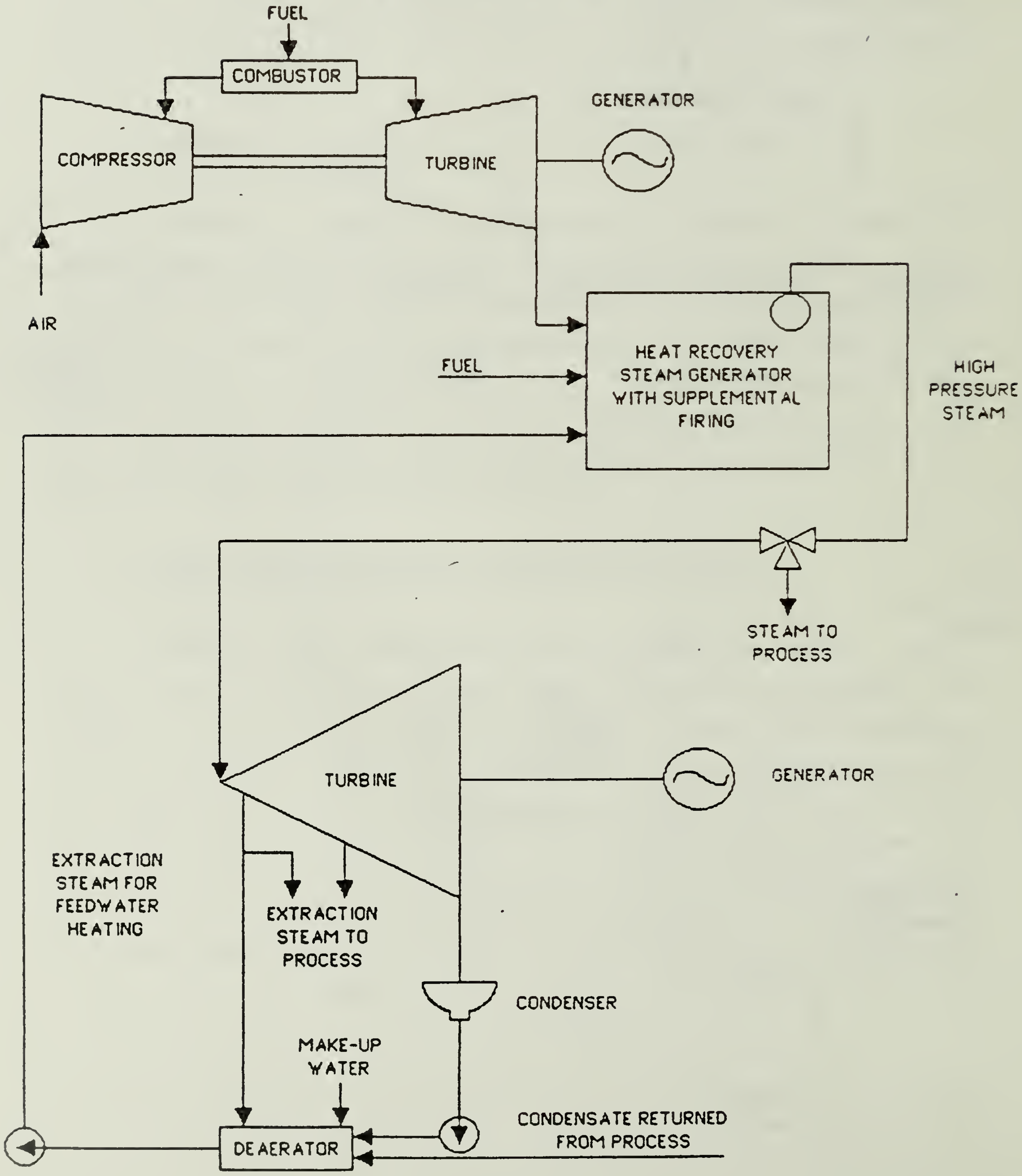


Figure II-3

STEAM TURBINE/COMBUSTION TURBINE COMBINED-CYCLE


FUEL
COMBUSTOR
GENERATOR
COMPRESSOR
TURBINE
AIR
HEAT RECOVERY STEAM GENERATOR WITH SUPPLEMENTAL FIRING
FUEL
HIGH PRESSURE STEAM
STEAM TO PROCESS
TURBINE
GENERATOR
EXTRACTION STEAM FOR FEEDWATER HEATING
EXTRACTION STEAM TO PROCESS
CONDENSER
MAKE-UP WATER
CONDENSATE RETURNED FROM PROCESS
DEAERATOR

- Cogeneration Plant Sizing

Cogeneration systems can be designed to meet all or part of a plants thermal or electrical needs. Most often, they are sized to meet the thermal demands but, may also be sized to meet the electrical demands. Given favorable electricity buyback rates, the plant may be oversized in order to sell excess electricity. In this project, cogeneration plants were sized to meet peak thermal demand. The consequences of this assumption are dependent on the type of technology. For those sites examined in this survey, a steam turbine which is matched to meet thermal demand, will not, in most cases, produce sufficient electricity to meet a plant's electrical needs. In the case of a gas turbine, thermally matched systems will most likely produce more electricity than is required. The combined cycle systems will most likely produce better than twice the needed electricity if the plant is thermally matched.

To compare the electrical output of the cogeneration systems it is necessary to fix the conditions of the steam supplied to the industrial process, steam conditions of 150 psia saturated steam (358^{o}F) were selected as meeting the majority of plant requirements. Using these conditions, performance parameters can be estimated. Operating parameters are presented in Table II-7. This table presents the size of commercially available cogeneration systems, steam flow rates required to produce 1 MW of electrical output and the electric to thermal output ratio. Note that the combined cycle requires the smallest flow rate to produce 1 MW, but that the smallest available system is 4 MW. The 4 MW system requires a flow rate of 15,268 lb/hour.

3. Computer Model

The computer model was developed to integrate the rating of cogeneration potential and the sizing of cogeneration technologies. The model performs three separate functions which are:

Table II-7

COGENERATION SYSTEM OPERATING CHARACTERISTICS

Technology	Available Unit Sizes	Steam Flow Rate at 1 MW* (lbm/hr)	Electric to Thermal Output Ratio (MW/1000 lbm/hr)*
Steam turbine	0.5 MW - 100 MW	18,518	0.054
Open cycle gas turbine	0.1 MW - 100 MW	6,536	0.153
Combined gas turbine/steam turbine	4.0 MW - 100 MW	3,817 (15,268)+	0.262

---

*Assuming outlet steam conditions of 150 psia saturated steam (358°F).

+Combined cycle size limitation is 4 MW. 15268 lbm/hr is the smallest flow rate possible.

Source: "Cogeneration: Assessment, Applications and Economics", Seminar Notebook, p.III-33, 34 & 35.

Office of Technology Assessment. Industrial and Commercial Cogeneration. Report PB83-180547., 1982.

- Screen plants and reject those which cannot support a 1 MW combustion turbine cogeneration plant and those which currently produce electrical power
- Assign factor scores and calculate potential scores
- Evaluate technology options and develop cogeneration capacity estimates.

A discussion of these three functions follows.

- **Screening Process**

The survey of industrial sites included plants with steam flows of 100 lb/hr to 1,000,000 lb/hr. Cogeneration potential exists in all of these plants, but for this project was limited to those sites which could produce at least 1 MW. The plants which did not have this capacity were removed from further evaluation based on the cogeneration technologies chosen for evaluation. Of the three technologies evaluated the combustion turbine required the lowest steam flow rate to produce 1 MW of power, requiring 6536 lb/hr of steam. Any plant which did not have a minimum of 6536 lb/hr peak steam demand was considered out of scope.

Plants were also removed from consideration if they currently produced electricity on site and that system also provided staem for process or other uses. In the case of a plant which utilized a bottoming cycle cogeneration system (i.e. one which does not produce process steam) a value of one was assigned to its process steam production, thereby satisfying the electrical and steam production requirements.

- **Assigning Potential Scores**

After the model eliminated sites which were out of scope, the plants' cogeneration potential was calculated. Each plant was assigned a series of factor scores according to the methodology previously outlined. The factor scores were multiplied by their factor weights and added to generate a total score. The total score was then converted to a percentage, the plant's potential score.

The plants were grouped by their potential score into three classifications as follows:

- Low Potential - plants receiving a score between thirty and sixty inclusive.
- Medium Potential - plants receiving a score between sixty-one and seventy-five inclusive.
- High Potential - plant receiving a score greater than seventy-five.

The limits of these classifications were determined through a sampling technique. Thirty-four plants were qualitatively assigned a cogeneration potential based on a scale of low, medium and high. Next they were assigned a potential score by the model. The two methods were compared and the limits of the modeling classifications were adjusted to attain the closest match between the two approaches.

The groupings, like the potential scores, must not be interpreted as absolute numbers. They represent relative potentials. While a plant scoring a thirty is definitely a low potential site, one which is on the upper end of the low scale may in fact have more potential than a site in the low end of the medium scale.

- Developing Cogeneration Capacity Estimates

Cogeneration capacity estimates were calculated for four systems utilizing the three technology choices. Estimates were developed for the following systems:

- Gas-fired steam turbine
- Coal-fired steam turbine
- Combustion turbine
- Steam turbine/combustion turbine combined cycle.

In all cases the systems were sized to match the plant's peak thermal demands.

The capacity of a cogeneration system was calculated using the following formula:

$$MW = P_R * SPEAK * 100/OLVL$$

Where:

P_R = Power Ratio - ratio of electrical power output in MW to thermal output in thousand pounds per hour

SPEAK = peak steam demand in thousands of pounds per hour

OLVL = percent level at which the plant is operating

Power ratios for the three technologies are as follows:

- Steam Turbine - 0.054 MW/1000 lbm/hr
- Combustion Turbine - 0.153 MW/1000 lbm/hr
- Combined Cycle - 0.262 MW/100 lbm/hr

For each of the four systems a capacity was calculated and the ratio of the system's electrical capacity to the plant peak electrical demand was developed.

A minimum and a maximum cogeneration capacity was calculated for every plant. The minimum potential was the lowest value for the four systems and the plant's peak electrical demand except where a technology was not applicable to the site. The plant's peak electrical demand was included because a plant may decide to size a plant to meet its peak electrical, rather than its peak thermal demands. The maximum was calcualted in a similar fashion.

Special sizing considerations must be applied to the steam turbine and combined cycle systems. Plants which did not have the minimum steam requirements for a combustion turbine were previously eliminated. If a plant's peak thermal demand was less than 18,520 lb/hr it could not produce 1 MW utilizing a steam turbine. Therefore, the capacity of this plant using the steam turbine technology was zero. Likewise, if a plant's peak thermal demand was less than 15,260 lb/hr, its combined cycle system capacity was zero.

Analyzing the potential for coal utilization was a special consideration of the project. In Section III of the survey (see Appendix A) the plant manager's were questioned about the possibility of installing a coal burning facility at their site. If the manager responded negatively, they were asked which of the following were constraints on their using coal:

- Capital cost too high
- Not enough space
- Air pollution restrictions too severe for even coal-fired systems with scrubbers
- Dirty air streams would contaminate the product
- Other.

The purpose of the question was to determine which plants were technically restricted from burning coal.

Realizing that capital cost is not a technical limitation any plant which only selected that reason was called to clarify their answer. Of the possible reasons not to burn coal only the second and fourth reasons positively prohibited coal use. The plants which were not evaluated for the coal fired steam turbine were those plants which indicated that they did not have enough space or that dirty air streams would contaminate their product.

Summarizing the cogeneration capacity estimates, a plant was evaluated for a specific technology if it had the minimum peak steam demand required by the technology. Additionally, the plant had to have the ability to burn coal to be sized for a coal fired steam turbine. In each case, the ratio of cogeneration capacity to plant peak electrical demand was calculated, and the minimum and maximum cogeneration capacities were calculated.

III. COGENERATION INVENTORY

III. COGENERATION INVENTORY

A. INTRODUCTION

This section presents the inventory of cogenerators in the State of Illinois with a capacity greater than 1 MW. The object of the inventory was to confirm the status of the existing cogenerators and obtain information on the operating characteristics of the system.

B. RESULTS

Initially, the development of the cogeneration inventory was considered to be a separate task from the identification of cogeneration potential. Two listings of sites were generated. SRC developed the cogenerators listing by searching secondary resources. Table III-1 lists the literature reviewed and Table III-2 lists the trade contacts. ENR provided the listing of industrial sites in Illinois. To positively confirm the status of the cogeneration facilities, the original plan was to telephone the sites to verify the information obtained.

After an initial round of confirmation calls, two problems were identified. First, many of the companies which were identified as cogenerators were also on the ENR industrial site listing. Since the tasks were being performed concurrently the plants were being called twice for the same information. The second problem was that a number of cogenerators, while willing to provide information, did not have the time or information readily available to answer questions over the telephone. To avoid these problems, the two listings were combined.

The combining of the listings eliminated duplication errors but it also exposed the cogeneration inventory to a greater possibility of

Table III-1

LITERATURE REVIEW

Title	Publisher
Cogeneration	Pequot Publishing
Cogeneration Data Base	EPRI
Cogeneration Letter	Energy Engineering
Cogeneration Report	McGraw-Hill Inc.
Cogeneration and Small Power Monthly	Farragut Station
Energy User News	Fairchild Publications
Federal Gas Exemption Dockets	
FERC, Form 4, "Monthly Power Plant Report	FERC
FERC Qualifiying Status Dockets	FERC
General Electric Cogeneration Review	General Electric

Table III-2

TRADE CONTACTS

Company	Location
Allison Energy Systems	Indianapolis, IN
Barber-Coleman Co.	Rockford, IL
Detrot Diesel	Chicago, IL
Floor Power Services	Chicago, IL
Ford-Industrial Engine Division	Deerborn, MI
Illinois Commerce Commission	Springfield, IL
Makowski Associates Inc.	Boston, MA
Midwest Co.	Chicago, IL
Trane Company	St. Paul, MN
Trane Company	Chicago, IL
Waukesha Engine Division, Dresser Industries	Chicago, IL

being incomplete. To avoid this problem a special tracking system was employed for the cogenerator surveys. More emphasis was placed on the cogenerators than on the industrial sites. The cogenerators were called up to five times. When one contact would not provide information another source was sought. In some instances, where plant personnel would not or could not complete the survey, a simple confirmation of cogeneration system capacity was sought.

A total of seventy possible cogenerators were identified. These were listed as possible because the listing includes plants which may be considering cogeneration, have closed, or produce electrical but not thermal energy. The survey confirmed 30 of these plants as cogenerators with a combined capacity of 425 MW. Table III-3 presents a summary of the cogeneration inventory.

The inventory of cogenerators can be found in Appendix C. Five listings are provided. The listing are:

- Confirmed Cogenerators
- Systems Producing Electrical Power Only
- Sites Planning to Install Cogeneration
- Unconfirmed Cogenerators
- Plants Closed.

Table III-3

SUMMARY OF COGENERATION INVENTORY

Cogeneration Plant Status	Number of Sites	Cogeneration System Capacity (MW)
Cogenerator	30	425
Electricity Production Only	7	18.2
Unconfirmed Cogenerators	3	11.2
Planning Cogeneration System within five years	27	124.5
Plant Moved or Closed	3	61
Total Possible Cogenerators	70	639.9

IV. COGENERATION POTENTIAL ASSESSMENT

IV. COGENERATION POTENTIAL ASSESSMENT

A. INTRODUCTION

This section presents the results of the industrial site surveys and of the evaluation of technical potential for cogeneration.

B. SURVEY RESULTS

The listing of industrial sites in Illinois consisted of 622 individual sites. This initial list was subjected to a pre-screening process whereby an attempt was made to contact the individual with the knowledge and authority to complete the survey. Of the total population 473 plants were successfully contacted. This represents 76% of the available plants. The remaining 149 plants could not be contacted for one reason or another. Table IV-1 shows the results of the pre-screening survey.

Surveys were mailed to the 473 plants which were successfully contacted through the pre-screening survey. Mailings were also sent to the 63 sites for which no telephone listing was obtained. The majority of these 63 surveys were returned by the post office as undeliverable. These were sent with the hope of increasing the number of replies. However, they will not be considered in the calculations of response rates since the probability of having any of them completed and returned is very low.

As mentioned in Section III the cogenerator listing developed by SRC and the industrial site listing provided by ENR were combined. This produced an additional 20 mailings. The number of mailings in which a contact had been identified was 493, the number which was used to calculate response rates. The total number of mailings was 556.

Table IV-1

RESULTS OF THE PRESCREENING SURVEY

Contact Results	Number of Plants	Percentage of Total Plants
Contact Made	473	76.0
No Listing for Site	63	10.1
Plant Closed	31	5.0
Miscellaneous	20	3.2
No Answer	16	2.6
Site is not a Plant	16	2.6
Refusal	3	0.5
Total	622	100

A cut-off date for survey returns was established for Friday, September 13. By this date 184 surveys had been returned or completed via telephone interviews. This translates to a response rate of 37%, which compares favorably to typical mail surveys of industrial plants which have response rates of about 20 - 30%. Of these replies, 154 were evaluated for cogeneration potential and 30 were cogenerators. The plant data for each of the responses can be found in Appendix D.

C. COGENERATION POTENTIAL RESULTS

One hundred fifty-four plants were evaluated for potential to cogenerate. Four classifications were developed as follows:

- Plants which did not have sufficient steam flow to support a 1 MW gas turbine
- Plants with a low potential for cogeneration. Potential score between 30 - 60% inclusive
- Plants with a medium potential for cogeneration. Potential score between 61 - 75% inclusive
- Plants with a high potential for cogeneration. Potential score greater than 75%.

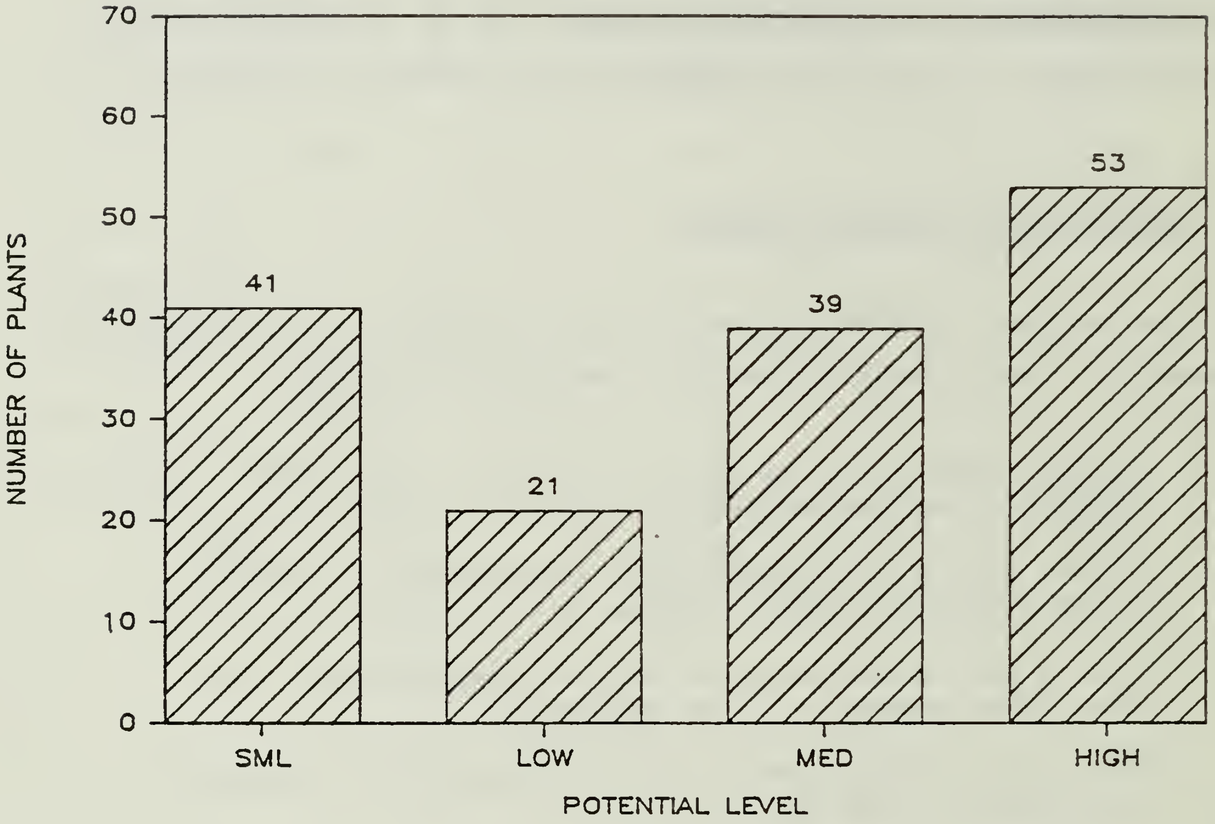
Figure IV-1 presents the number of sites by potential level.

Cogeneration capacity was evaluated for a steam turbine fired by gas and coal, a gas turbine, and a combined cycle system. The cogeneration capacity by potential level is shown in Table IV-2.

Tables IV-3, IV-4 and IV-5 present summaries of potential scores and various technology capacity sizes for low, medium and high potential scoring sites. Each table presents individual factor scores, total potential scores, technology capacity figures, ratio of system electrical output to plant peak electrical demand for each technology, plant peak electrical demand, minimum cogeneration capacity and maximum cogeneration capacity.

Figure IV-1

NUMBER OF PLANTS BY POTENTIAL CLASSIFICATION



LEGEND

SML - Plants too small to support 1 MW gas turbine.

LOW - Potential score between 30 - 60% inclusive.

MED - Potential score between 61 - 75% inclusive.

HIGH - Potential score above 75%.

Table IV-2

SUMMARY OF COGENERATION CAPACITY BY TECHNOLOGY AND POTENTIAL LEVEL

Potential	Gas-Fired Steam Turbine (MW)	Coal-Fired Steam Turbine (MW)	Combustion Turbine (MW)	Combined Cycle (MW)	Peak Electrical Load (MW)	Minimum Cogeneration Capacity (MW)	Maximum Cogeneration Capacity (MW)
Low	30.16	23.41	110.02	160.09	62.48	33.61	186.70
Medium	127.53	42.46	387.88	641.41	379.10	106.48	777.42
High	346.24	188.30	992.48	1684.35	758.10	318.15	1889.83
Total	503.93	254.16	1490.38	2485.85	1199.68	458.24	2853.96

Table IV-3

SUMMARY OF POTENTIALS AND CAPACITIES FOR LOW POTENTIAL PLANTS

				LOAD VARIATIONS						
PLANT CODE NUMBER	OPERATING HOURS SCORE	STEAM LOAD SCORE	DAILY ELECTRIC SCORE	DAILY STEAM SCORE	SEASONAL ELECTRIC SCORE	SEASONAL STEAM SCORE	WASTE HEAT SCORE	BOILER AGE SCORE	TOTAL POTENTIAL SCORE	PERCENTAGE SCORE
LOW POTENTIAL SCORING										
462	1	1	1	1	2	1	3	1	36	33
497	1	1	1	2	1	1	3	1	38	35
140	1	3	1	1	1	1	3	3	42	38
171	1	1	2	2	1	1	3	3	44	40
507	1	1	2	2	1	1	3	3	44	40
7	1	1	2	2	2	1	3	1	46	42
512	3	1	1	1	1	1	3	2	49	45
84	1	1	2	2	2	2	3	3	50	45
103	3	1	1	1	2	1	3	2	53	48
116	1	1	2	2	3	3	3	1	54	49
389	1	2	2	3	1	3	2	2	56	51
219	3	2	2	1	1	1	3	2	57	52
135	1	1	3	2	3	2	3	3	58	53
424	3	1	2	2	1	1	3	3	60	55
181	3	1	2	1	3	2	3	2	63	57
446	5	1	1	1	1	1	3	1	64	58
483	3	2	2	2	1	1	3	3	64	58
510	5	1	1	1	1	1	3	1	64	58
287	3	1	2	2	2	2	3	2	65	59
554	1	2	3	3	3	1	3	3	66	60
580	3	3	2	1	2	2	2	2	66	60

Table IV-3

SUMMARY OF POTENTIALS AND CAPACITIES FOR LOW POTENTIAL PLANTS

(continued)

PLANT CODE NUMBER	GAS-FIRED STEAM TURBINE (MW)	RATIO ST/EPEAK	COAL-FIRED STEAM TURBINE (MW)	RATIO ST/EPEAK	GAS TURBINE (MW)	RATIO GT/EPEAK	COMBINED CYCLE (MW)	RATIO CC/EPEAK	ELECTRICAL PEAK LOAD (MW)	MINIMUM CAPACITY (MW)	MAXIMUM CAPACITY (MW)
LOW POTENTIAL SCORING											
462	0.00	0.00	0.00	0.00	1.08	0.83	0.00	0.00	1.30	1.08	1.30
497	0.00	0.00	0.00	0.00	2.14	0.27	0.00	0.00	8.00	2.14	8.00
140	5.76	2.40	5.76	1.80	16.32	5.10	27.95	8.73	2.40	2.40	27.95
171	0.00	0.00	0.00	0.00	2.75	2.75	4.72	4.72	1.00	1.00	4.72
507	0.00	0.00	0.00	0.00	2.68	13.39	4.59	22.93	0.20	0.20	4.59
7	0.00	0.00	0.00	0.00	1.99	0.57	0.00	0.00	3.50	1.99	3.50
512	0.00	0.00	0.00	0.00	1.38	0.69	0.00	0.00	2.00	1.38	2.00
84	0.00	0.00	0.00	0.00	1.84	4.83	0.00	0.00	0.38	0.38	1.84
103	0.00	0.00	0.00	0.00	2.30	0.88	0.00	0.00	2.60	2.30	2.60
116	0.00	0.00	0.00	0.00	1.22	4.08	0.00	0.00	0.30	0.30	1.22
389	2.38	0.50	2.38	0.50	6.73	1.40	11.53	2.40	4.80	2.38	11.53
219	1.35	0.29	0.00	0.00	3.83	0.83	6.55	1.42	4.60	1.35	6.55
135	0.00	0.00	0.00	0.00	1.22	4.08	0.00	0.00	0.30	0.30	1.22
424	0.00	0.00	0	0.00	1.84	0.54	0.00	0.00	3.4	1.84	3.40
181	0.00	0.00	0.00	0.00	2.60	3.72	4.45	6.36	0.70	0.70	4.45
446	1.62	0.81	1.62	0.81	4.59	2.30	7.86	3.93	2.00	1.62	7.86
483	3.78	0.38	3.78	0.38	10.71	1.07	18.34	1.83	10.00	3.78	18.34
510	3.39	3.39	3.39	1.19	9.62	3.37	16.47	5.76	1.00	1.00	16.47
287	0.00	0.00	0.00	0.00	1.53	3.83	0.00	0.00	0.40	0.40	1.53
554	5.40	2.25	0.00	0.00	15.30	6.38	26.20	10.92	0.60	0.60	26.20
580	6.48	0.50	6.48	0.50	18.36	1.41	31.44	2.42	13.00	6.48	31.44
TOTAL	30.16		23.41		110.02		160.09		62.48	33.61	186.70

Table IV-4

SUMMARY OF POTENTIALS AND CAPACITIES FOR MEDIUM POTENTIAL PLANTS

PLANT CODE NUMBER	OPERATING HOURS SCORE	STEAM LOAD SCORE	DAILY ELECTRIC SCORE	LOAD VARIATIONS DAILY STEAM SCORE	SEASONAL ELECTRIC SCORE	SEASONAL STEAM SCORE	WASTE HEAT SCORE	BOILER AGE SCORE	TOTAL POTENTIAL SCORE	PERCENTAGE SCORE
MEDIUM POTENTIAL SCORING										
57	3	2	2	2	2	2	3	1	68	62
204	3	2	2	2	2	1	3	3	68	62
197	5	1	2	1	1	1	3	2	69	63
93	3	2	2	2	3	1	3	2	71	65
448	3	2	3	2	2	1	3	2	71	65
120	5	3	1	1	1	1	3	1	72	65
162	5	1	3	1	1	1	3	1	72	65
568	3	3	2	2	2	1	3	3	72	65
594	3	4	2	2	1	1	3	3	72	65
82	5	1	2	1	2	1	2	3	73	66
583	5	3	1	1	1	1	3	2	73	66
153	5	1	2	2	1	1	3	1	74	67
186	5	2	2	1	1	2	3	1	74	67
264	5	1	1	1	2	3	3	3	74	67
391	5	2	1	1	2	2	3	1	74	67
473	1	3	3	3	3	3	3	3	74	67
615	5	4	1	1	1	1	3	1	76	69
216	5	1	2	1	3	1	3	2	77	70
367	5	2	2	1	2	1	3	2	77	70
516	5	2	1	2	1	2	3	2	77	70
533	3	2	3	3	2	1	2	3	77	70
303	5	2	1	2	2	1	2	3	79	72
324	5	2	1	2	2	1	3	2	79	72
327	5	1	2	2	2	1	2	3	79	72
363	5	1	2	2	2	1	3	2	79	72
378	5	2	1	2	2	1	3	2	79	72
453	5	1	1	2	3	1	3	2	79	72
521	5	2	2	2	1	1	2	3	79	72
4	5	2	1	1	3	3	2	2	80	73
117	5	2	2	2	1	1	3	3	80	73
244	3	2	3	3	2	2	3	3	80	73
317	5	2	2	2	1	2	2	2	80	73
714	3	2	3	3	3	1	3	1	80	73
115	5	1	2	2	2	2	3	2	81	74
295	5	1	2	2	2	2	3	2	81	74
357	5	3	2	2	1	1	3	1	82	75
433	5	1	3	1	3	1	3	3	82	75
505	5	2	2	2	2	1	3	2	83	75
293	5	2	2	2	2	1	3	2	83	75

Table IV-4

SUMMARY OF POTENTIALS AND CAPACITIES FOR MEDIUM POTENTIAL PLANTS

(continued)

PLANT CODE NUMBER	GAS-FIRED STEAM TURBINE (MW)	RATIO ST/EPEAK	COAL-FIRED STEAM TURBINE (MW)	RATIO ST/EPEAK	GAS TURBINE (MW)	RATIO GT/EPEAK	COMBINED CYCLE (MW)	RATIO CC/EPEAK	ELECTRICAL PEAK LOAD (MW)	MINIMUM CAPACITY (MW)	MAXIMUM CAPACITY (MW)
MEDIUM POTENTIAL SCORING											
57	0.00	0.00	0.00	0.00	1.84	1.22	0.00	0.00	1.50	1.50	1.84
204	2.59	0.70	0.00	0.00	7.34	1.98	12.58	3.40	3.70	2.59	12.58
197	0.00	0.00	0.00	0.00	1.22	0.49	0.00	0.00	2.50	1.22	2.50
93	1.30	0.81	0.00	0.00	3.67	2.30	6.29	3.93	1.60	1.30	6.29
448	1.25	1.25	0.00	0.00	3.55	3.55	6.08	6.08	1.00	1.00	6.08
120	32.40	0.36	0.00	0.00	91.80	1.02	157.20	1.75	90.00	1.08	157.20
162	0.00	0.00	0.00	0.00	1.84	0.71	0.00	0.00	2.60	1.84	2.60
568	9.45	0.59	9.45	0.59	26.78	1.67	45.85	2.87	16.00	9.45	45.85
594	8.10	1.98	0.00	0.00	22.95	5.60	39.30	9.59	4.10	4.10	39.30
82	0.00	0.00	0.00	0.00	1.99	1.46	0.00	0.00	1.36	1.36	1.99
583	9.72	0.81	0.00	0.00	27.54	2.30	47.16	3.93	12.00	9.72	47.16
153	0.00	0.00	0.00	0.00	2.30	1.00	0.00	0.00	2.30	2.30	2.30
186	1.35	1.04	0.00	0.00	3.83	2.94	6.55	5.04	1.30	1.30	6.55
264	1.26	1.26	0.00	0.00	3.57	2.14	6.11	3.67	1.00	1.00	6.11
391	1.89	0.30	0.00	0.00	5.36	0.86	9.17	1.48	6.20	1.89	9.17
473	3.35	3.72	0.00	0.00	9.49	10.54	16.24	18.05	0.90	0.90	16.24
615	13.50	1.45	13.50	1.45	38.25	4.11	65.50	7.04	9.30	9.30	65.50
216	0.00	0.00	0.00	0.00	2.45	0.61	4.19	1.05	4.00	2.45	4.19
367	3.38	1.30	3.38	1.04	9.56	2.94	16.38	5.04	2.60	2.60	16.38
516	1.08	0.11	0.00	0.00	3.06	0.32	5.24	0.55	9.50	1.08	9.50
533	2.43	0.49	0.00	0.00	6.89	1.38	11.79	2.36	5.00	2.43	11.79
303	1.89	0.02	0.00	0.00	5.36	0.04	9.17	0.08	120.00	1.89	120.00
324	3.46	0.69	0.00	0.00	9.79	1.96	16.77	3.35	5.00	3.46	16.77
327	0.00	0.00	0.00	0.00	1.84	0.87	0.00	0.00	2.10	1.84	2.10
363	1.40	0.70	0.00	0.00	3.96	1.98	6.79	3.39	2.00	1.40	6.79
378	0.00	0.00	0.00	0.00	2.68	0.58	4.59	1.00	4.60	2.68	4.60
453	1.08	2.00	0.00	0.00	3.06	5.67	5.24	9.70	0.54	0.54	5.24
521	3.24	0.72	0.00	0.00	9.18	2.04	15.72	3.49	4.50	3.24	15.72
4	0.00	0.00	0.00	0.00	2.75	0.28	4.72	0.47	10.00	2.75	10.00
117	3.24	1.16	3.24	1.16	9.18	3.28	15.72	5.61	2.80	2.80	15.72
244	0.00	0.00	0.00	0.00	2.60	2.17	4.45	3.71	1.20	1.20	4.45
317	3.49	0.37	3.49	0.31	9.90	0.89	16.95	1.52	9.50	3.49	16.95
714	4.32	0.49	4.32	0.49	12.24	1.38	20.96	2.36	8.90	4.32	20.96
115	0.00	0.00	0.00	0.00	2.75	1.02	4.72	1.75	2.70	2.70	4.72
295	0.00	0.00	0.00	0.00	2.30	1.04	0.00	0.00	2.20	2.20	2.30
357	3.78	0.30	3.78	0.30	10.71	0.86	18.34	1.47	12.50	3.78	18.34
433	1.30	0.65	1.30	0.65	3.67	1.84	6.29	3.14	2.00	1.30	6.29
505	1.89	1.72	0.00	0.00	5.36	4.87	9.17	8.34	1.10	1.10	9.17
293	5.40	0.60	0.00	0.00	15.30	1.70	26.20	2.91	9.00	5.40	26.20
TOTAL	127.53		42.46		387.88		641.41		379.10	106.48	777.42

Table IV-5

SUMMARY OF POTENTIALS AND CAPACITIES FOR HIGH POTENTIAL PLANTS

				LOAD VARIATIONS						
PLANT CODE NUMBER	OPERATING HOURS SCORE	STEAM LOAD SCORE	DAILY ELECTRIC SCORE	DAILY STEAM SCORE	SEASONAL ELECTRIC SCORE	SEASONAL STEAM SCORE	WASTE HEAT SCORE	BOILER AGE SCORE	TOTAL POTENTIAL SCORE	PERCENTAGE SCORE
HIGH POTENTIAL SCORING										
15	5	2	2	2	2	1	3	3	84	76
193	5	2	2	2	2	1	3	3	84	76
422	5	2	2	2	2	2	2	2	84	76
467	5	2	3	1	2	2	3	3	84	76
548	5	4	1	2	1	1	3	3	84	76
581	5	3	2	2	1	2	3	1	84	76
70	5	2	2	2	2	2	2	3	85	77
188	5	2	2	2	2	2	3	2	85	77
241	5	3	2	2	2	1	1	2	85	77
482	3	2	3	3	3	3	3	2	85	77
578	5	2	2	2	2	2	3	2	85	77
9	5	3	2	2	2	1	3	1	86	78
24	5	2	2	2	2	2	3	3	86	78
85	5	2	2	2	2	2	3	3	86	78
119	5	2	2	3	1	2	3	1	86	78
385	5	3	2	2	2	1	3	1	86	78
419	5	2	2	2	2	2	3	3	86	78
592	5	3	2	2	2	1	1	3	86	78
80	5	4	2	2	1	1	3	2	87	79
561	5	3	1	2	3	1	3	2	87	79
613	5	4	2	2	1	1	3	2	87	79
335	5	4	2	2	1	2	2	2	88	80
488	5	2	2	2	3	2	2	2	88	80
544	5	2	2	3	1	2	3	3	88	80
285	5	2	2	3	2	1	3	2	89	81
545	5	3	2	2	2	2	3	2	89	81
19	5	3	2	2	2	2	3	3	90	82
414	5	3	2	2	2	2	3	3	90	82
160	5	1	3	3	3	1	3	1	92	84
430	5	1	3	3	3	1	2	2	92	84
558	5	4	2	2	2	1	3	3	92	84
223	5	2	3	3	2	1	3	2	93	85
227	5	3	2	3	2	1	3	2	93	85
269	5	2	3	2	3	2	2	3	93	85
25	5	2	3	3	2	2	3	1	94	85
257	5	3	1	3	3	1	3	3	94	85
386	5	4	2	2	2	2	3	3	94	85
111	5	2	3	3	2	2	3	2	95	86
313	5	2	3	3	2	2	2	3	95	86
67	5	3	3	2	3	2	3	1	96	87
147	5	2	3	3	2	2	3	3	96	87
35	5	2	3	3	3	1	3	3	98	89
77	5	2	3	3	3	1	3	3	98	89
434	5	3	2	3	3	1	3	3	98	89
531	5	2	3	3	3	1	3	3	98	89
211	5	4	3	2	3	1	3	2	99	90
411	5	4	3	2	3	1	3	2	99	90
95	5	4	3	3	2	1	3	2	101	92
415	5	2	3	3	3	3	3	2	101	92
607	5	4	3	3	2	1	3	2	101	92
351	5	4	3	3	3	3	3	2	109	99
376	5	4	3	3	3	3	3	2	109	99
380	5	4	3	3	3	3	3	2	109	99

Table IV-5

SUMMARY OF POTENTIALS AND CAPACITIES FOR HIGH POTENTIAL PLANTS

(continued)

PLANT CODE NUMBER	GAS-FIRED STEAM TURBINE (MW)	RATIO ST/EPEAK	COAL-FIRED STEAM TURBINE (MW)	RATIO ST/EPEAK	GAS TURBINE (MW)	RATIO GT/EPEAK	COMBINED CYCLE (MW)	RATIO CC/EPEAK	ELECTRICAL PEAK LOAD (MW)	MINIMUM CAPACITY (MW)	MAXIMUM CAPACITY (MW)
HIGH POTENTIAL SCORING											
15	2.38	0.24	0.00	0.00	6.73	0.67	11.53	1.15	10.00	2.38	11.53
193	1.51	1.37	0.00	0.00	4.28	3.89	7.34	6.67	1.10	1.10	7.34
422	1.57	0.42	0.00	0.00	4.44	1.20	7.60	2.05	3.70	1.57	7.60
467	6.48	0.63	0.00	0.00	18.36	1.78	31.44	3.05	10.30	6.48	31.44
548	12.10	0.53	12.10	0.53	34.27	1.49	58.69	2.55	23.00	12.10	58.69
581	5.40	0.27	0.00	0.00	15.30	0.77	26.20	1.31	20.00	5.40	26.20
70	3.24	0.77	3.24	0.77	9.18	2.19	15.72	3.74	4.20	3.24	15.72
188	3.24	1.30	3.24	1.30	9.18	3.67	15.72	6.29	2.50	2.50	15.72
241	6.48	1.62	6.48	1.62	18.36	4.59	31.44	7.86	4.00	4.00	31.44
482	1.46	0.29	0.00	0.00	4.13	0.81	7.07	1.39	5.10	1.46	7.07
578	3.24	0.65	0.00	0.00	9.18	1.84	15.72	3.14	5.00	3.24	15.72
9	6.64	0.37	6.64	0.37	18.82	1.05	32.23	1.79	18.00	6.64	32.23
24	2.16	0.15	0.00	0.00	6.12	0.44	10.48	0.75	14.00	2.16	14.00
85	0.00	0.00	0.00	0.00	2.60	1.86	4.45	3.18	1.40	1.40	4.45
119	1.62	0.16	0.00	0.00	4.59	0.46	7.86	0.79	10.00	1.62	10.00
385	8.10	0.20	8.10	0.20	22.95	0.57	39.30	0.98	40.00	8.10	40.00
419	1.35	0.68	1.35	0.68	3.83	1.91	6.55	3.28	2.00	1.35	6.55
592	6.53	0.42	0.00	0.00	18.51	1.19	31.70	2.05	15.50	6.53	31.70
80	6.75	0.61	6.75	0.61	19.13	1.74	32.75	2.98	11.00	6.75	32.75
561	12.42	0.50	12.42	0.50	35.19	1.41	60.26	2.41	25.00	12.42	60.26
613	20.79	1.09	0.00	0.00	58.91	3.10	100.87	5.31	19.00	19.00	100.87
335	37.80	0.91	0.00	0.00	107.10	2.58	183.40	4.42	41.50	37.80	183.40
488	0.00	0.00	0.00	0.00	2.14	0.63	0.00	0.00	3.40	2.14	3.40
544	1.94	0.04	1.94	0.04	5.51	0.10	9.43	0.17	55.00	1.94	55.00
285	3.78	2.10	3.78	2.10	10.71	5.95	18.34	10.19	1.80	1.80	18.34
545	4.32	0.43	0.00	0.00	12.24	1.22	20.96	2.10	10.00	4.32	20.96
19	5.08	2.99	0	0.00	14.38	8.46	24.63	14.49	1.7	1.70	24.63
414	5.40	1.20	0.00	0.00	15.30	3.40	26.20	5.82	4.50	4.50	26.20
160	0.00	0.00	0.00	0.00	1.53	0.70	0.00	0.00	2.20	1.53	2.20
430	1.08	1.20	1.08	1.20	3.06	3.40	5.24	5.82	0.90	0.90	5.24
558	15.12	0.63	15.12	0.63	42.84	1.79	73.36	3.06	24.00	15.12	73.36
223	2.43	0.03	0.00	0.00	6.89	0.08	11.79	0.14	85.00	2.43	85.00
227	6.48	0.08	6.48	0.08	18.36	0.23	31.44	0.39	80.00	6.48	80.00
269	1.30	1.08	0.00	0.00	3.67	3.06	6.29	5.24	1.20	1.20	6.29
25	0.00	0.00	0.00	0.00	1.68	0.56	0.00	0.00	3.00	1.68	3.00
257	3.24	0.56	3.24	0.56	9.18	1.58	15.72	2.71	5.80	3.24	15.72
386	16.20	1.57	0.00	0.00	45.90	4.46	78.60	7.63	10.30	10.30	78.60
111	1.46	0.73	1.46	0.73	4.13	2.07	7.07	3.54	2.00	1.46	7.07
313	2.16	0.42	0.00	0.00	6.12	1.20	10.48	2.05	5.10	2.16	10.48
67	4.05	1.62	4.05	1.62	11.48	4.59	19.65	7.86	2.50	2.50	19.65
147	0.00	0.00	0	0.00	1.84	2.30	0.00	0.00	0.8	0.80	1.84
35	2.81	0.64	0.00	0.00	7.96	1.81	13.62	3.10	4.40	2.81	13.62
77	0.00	0.00	0.00	0.00	1.68	0.67	0.00	0.00	2.50	1.68	2.50
434	5.39	0.12	0.00	0.00	15.27	0.34	26.15	0.58	45.00	5.39	45.00
531	2.70	1.80	2.70	1.80	7.65	5.10	13.10	8.73	1.50	1.50	13.10
211	6.05	0.60	6.05	0.60	17.14	1.71	29.34	2.93	10.00	6.05	29.34
411	7.02	1.28	7.02	1.28	19.89	3.62	34.06	6.19	5.50	5.50	34.06
95	7.02	0.59	0.00	0.00	19.89	1.66	34.06	2.84	12.00	7.02	34.06
415	1.40	0.78	0.00	0.00	3.98	2.21	6.81	3.78	1.80	1.40	6.81
607	7.02	1.40	0.00	0.00	19.89	3.98	34.06	6.81	5.00	5.00	34.06
351	21.60	1.80	21.60	1.80	61.20	5.10	104.80	8.73	12.00	12.00	104.80
376	6.48	2.23	0.00	0.00	18.36	6.33	31.44	10.84	2.90	2.90	31.44
380	53.46	0.76	53.46	0.76	151.47	2.16	259.38	3.71	70.00	53.46	259.38
TOTAL	346.24		188.30		992.48		1684.35		758.10	318.15	1889.83

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Appendix A

COGENERATION SURVEY AND PRESCREENING TELEPHONE SCRIPT

ILLINOIS DEPARTMENT OF ENERGY AND NATURAL RESOURCES
COGENERATION SURVEY

I. PLANT CHARACTERISTICS

SIC Codes: Primary ______________ Products: Primary ______________
Secondary ______________ Secondary ______________

Operating Hours: Shifts/Day ______ Days/Week ______ Weeks/Year ______

Service Utilities: Electric ____
Natural Gas ____

II. ELECTRIC AND STEAM LOADS

Electric: Peak Demand ____________ kW Average Demand ______________ kW
Annual Electric Consumption ____________ kWh

Steam: Peak Demand ____________ lbs/hr Average Demand ____________ lbs/hr

Do the above loads represent a normal operating level? ☐ Yes ☐ No

If not, what percent of normal operating level do the loads represent? ________ %

What steam pressures are used in the plant, and what fraction of the peak and average steam demands is represented by these pressures?

Pressure (PSIG)	**Fraction of Average Demand**	**Fraction of Peak Demand**

How much variation is there in the electric and steam demands?

		Great Deal	Some	Little or None
Daily:	Electric	☐	☐	☐
	Steam	☐	☐	☐
Seasonal:	Electric	☐	☐	☐
	Steam	☐	☐	☐

What is your existing boiler capacity? ____________ lbs/hr

Do you expect to replace any boiler capacity in the next three years?
☐ Yes ☐ No

If yes, how much capacity will be replaced? ____________ lbs/hr

III. FUEL USE

Fuel Type	Annual Quantity	Units
Distillate fuel oil	______________	______________
Residual fuel oil	______________	______________
Natural gas	______________	______________
Coal	______________	______________
Other ______________	______________	______________
Other ______________	______________	______________

(If coal or other fuel is used, please specify heating value — Btu/lb.)

If you do not use coal, would it be possible to install a coal burning facility at your site? ☐ Yes ☐ No

If no, what are the constraints on using coal?
- ☐ Capital cost too high
- ☐ Not enough space
- ☐ Air pollution restrictions too severe for even coal-fired systems with scrubbers
- ☐ Dirty air streams would contaminate our product
- ☐ Other, specify ____

IV. ON-SITE GENERATION

Do you currently produce electric power on-site? ☐ Yes ☐ No

If you answered no, please proceed to Section V.

What type of system do you have?
☐ Steam Turbine ☐ Combustion Turbine ☐ Internal Combustion Engine

What year was the system placed in operation? ____________

What is the: Electrical Capacity ____________ kW
Annual Production ____________ kWh

Does this on-site generation produce steam for process or other uses?
☐ Yes ☐ No

If yes, what is the: Peak Production ____________ lbs/hr
Annual Production ____________ lbs/yr

What type of fuel is used? ________________________

What is the annual fuel consumption? ________________________

What type of utility interconnection do you have?
☐ Isolated ☐ Parallel ☐ Grid-Connected

Do you plan to expand your on-site generation capability in the next three years?
☐ Yes ☐ No

Please proceed to Section VIII.

V. PAST/FUTURE ON-SITE GENERATION

Has your facility engaged in on-site generation in the past? ☐ Yes ☐ No

If yes, why was it discontinued? ____________________

____

____

Have you considered cogeneration in view of the recent Federal regulations encouraging cogeneration? ☐ Yes ☐ No

If yes, do you plan to install a cogeneration system? ☐ Yes ☐ No

If yes, when? ____________

What will the electric capacity be? ________ kW
What will the steam capacity be? ________ lbs/hr

If no, why was the idea of cogeneration rejected?

- ☐ Lack of capital
- ☐ Low return on investment
- ☐ Concern about maintenance requirements
- ☐ Concern about skill requirements
- ☐ Possibility of utility resistance
- ☐ Power generation is not our business
- ☐ Environmental constraints
- ☐ Concern with being regulated by the Illinois Commerce Commission

VI. WASTE HEAT STREAMS

High temperature waste streams, such as stack gases from boilers and furnaces can sometimes be utilized for cogeneration. Please describe any waste heat streams which are over 400° F.

Stream temp. °F	Flow rate, Btu/hr, cfm, lbs/hr etc.	Stream material, air or other	Is there some heat recovery technology applied to this stream?	If yes, what is the final exhaust temp. of this stream? °F	Is this a "dirty" waste stream which would foul heat exchangers?
______	______	______	______	______	______
______	______	______	______	______	______
______	______	______	______	______	______
______	______	______	______	______	______
______	______	______	______	______	______

VII. HURDLE RATE

What hurdle rate is required for energy projects?
_____ percent rate of return or, _____ years payback
(Note: You may need to contact the financial officer to obtain the hurdle rate. Remind him/her that this data will remain confidential.)

VIII. BOILER CHARACTERISTICS

Please describe your boiler facilities.

Boiler #	Age	Types of Fuel	Annual Fuel Consumption	Psig Rating	Operating Psig	Percent of Average Steam Demand

IX. ADDITIONAL INFORMATION

The Illinois Department of Energy and Natural Resources would like to assist you by providing information on cogeneration. If any of the following literature would be helpful please check the appropriate box and the information will be mailed to you.

- ☐ Results of the cogeneration economic feasibility study for your plant.
- ☐ Listing of electric utility sales and buyback rates for cogenerators in Illinois.
- ☐ Listing of third party finance companies for cogeneration facilities.
- ☐ Listing of cogeneration equipment manufacturers.
- ☐ Bibliography of cogeneration literature.
- ☐ Information on Federal and State cogeneration regulations.

Please fill out your name and address below

Name ____________________ Phone __________

Company ______________________________

Plant Address ______________________________

City, State ____________________ Zip Code __________

Please Mail to:

Synergic Resources Corporation
Suite 1050, 555 City Line Avenue
Bala Cynwyd, Pennsylvania 19004

SRC-7266

ILLINOIS DEPARTMENT OF ENERGY AND NATURAL RESOURCES

Prescreening Telephone Script

(WHEN SECRETARY/PLANT OPERATOR ANSWERS:)

Good (Morning)(Afternoon), this is _____, calling for the Illinois Department of Energy and Natural Resources. May I speak with the Plant Engineer for your plant site?

(IF THERE IS NO PLANT ENGINEER, DETERMINE WHAT SITE PERSON HAS THE RESPONSIBILITY FOR ENERGY USAGE AT THE SITE -- THAT IS, THE PURCHASE, AND MONITORING OF USE, OF ELECTRICAL AND FOSSIL FUELS AT THAT LOCATION. IF OPERATOR IS UNCERTAIN, ASK IF THERE IS AN ENERGY MANAGER, OPERATIONS MANAGER OR PLANT SUPERINTENDANT TO WHOM YOU CAN SPEAK.)

(IF SECRETARY/OPERATOR ASKS PURPOSE OF CALL:)

The Illinois Department of Energy and Natural Resources has a document to be sent to your plant, and I am calling to verify who, at your site, should receive it. I need to speak to the (Plant Engineer/Energy Manager/Etc.) for just a moment.

(IF PLANT ENGINEER IS NOT AVAILABLE AT TIME OF CALL:)

When would be a good time to call back to reach him?

(RECORD CALLBACK INFORMATION ON SAMPLE)

(WHEN PLANT ENGINEER/ENERGY MANAGER/ETC. IS REACHED:)

Good (Morning) (Afternoon), Mr. _____, this is _________ calling for the Illinois Department of Energy and Natural Resources. Our department will soon be sending out a brief mail questionnaire dealing with potential use of cogeneration in Illinois. We want it to go to a person who is knowledgeable about your plant's operating characteristics and fuel use patterns, and who has the authority to complete the questionnaire -- are you the appropriate person at your plant site to whom we should address the survey?

(IF THIS RESPONDENT IS PROPER MAIL RESPONDENT, RECORD NAME ON SAMPLE FORM AND VERIFY ADDRESS. IF ANOTHER RESPONDENT IS NAMED, ASK TO TRANSFER CALL TO HIM, IF APPROPRIATE. REPEAT INTRODUCTION AND VERIFY THAT NEW PERSON IS PROPER RESPONDENT FOR MAILING.)

(ADD ADDITIONAL INFORMATION BELOW WHEN PROPER MAIL RESPONDENT IS VERIFIED, AND YOU ARE TALKING TO THE PERSON WHO WILL RECEIVE THE MAIL QUESTIONNAIRE:)

While I have you on the phone, today, I'd like to tell you briefly what the study is for, and what it includes, so you will be prepared for it when it arrives.

This study is part of the department's long range energy policy and planning responsibilities. Specifically, the state is interested in promoting the use of cogeneration, especially those systems capable of burning Illinois coal. We would like to emphasize that no plant specific information from the survey will be made public.

The questionnaire will only be four pages. The majority of the questions are yes/no type questions. A few deal with annual electricity, steam and fuel consumption.

It's important that we get responses from all of the sites in our sample, even if you are not planning any cogeneration activity, so we hope we can count on your cooperation. I'd like to thank you for your time today. We will be sending the questionnaire shortly, and would appreciate your completing it and returning it as soon as possible.

(IF RESPONDENT ASKS, "HOW DOES THIS BENEFIT ME (OR MY COMPANY?" SAY:)

In addition to helping the State develop a cogeneration potential and maintaining the competitive advantage of Illinois' industrial plants, your participation in the survey can be directly beneficial to you and your company.

If you wish, the State will provide you with a cogeneration prefeasibility study of your plant. This will be exclusive information, made available only to you. To get the study, when you complete the survey, just check the appropriate box requesting the analysis of your plant -- the results will be mailed to you.

Appendix B

DATA ENTRY CODES

FUEL TYPE	CODE	ELECTRIC UTILITIES	CODE	GAS UTILITIES	CODE
Distillate fuel oil	1	Central IL Light Co.	1	Central IL Light CO	1
Residual fuel oil	2	Central IL Public Servive	2	Central IL Public Servic	2
Natural gas	3	Commonwealth Edison	3	City of Flora	3
Coal, bituminous	4	IL Power	4	IL Power	4
Lignite	5	Iowa- IL Gas & El	5	Iowa - IL Gas and El	5
Nat gas & fuel oil	6	Rochelle munincipal	6	Miss. River Trans. Corp.	6
Slop oil	7	Rock Falls El Dept	7	North Shore Gas	7
Gas, coal, oil	8	St.Charles El Utility	8	Northern IL Gas	8
LPG	9	Shelbyville El	9	Peoples Energy	9
Pitch & gas	10	Union El	10	United Cities	10
Electric	11	Unlisted	11	Direct	11
Coal & gas	12			Unlisted	12
Steam	13				
Trash	14				
Oven gas	15				
Refinery gas	16				
Waste heat	17				

UNITS	CODE	WASTE HEAT FLOW RATE	CODE	MATERIAL	CODE	ON SITE GENERATION	CODE
Therms	1	BTU/HR	1	Flue gas	1	Steam turbine	1
Tons	2	CFM	2	Air	2	Combustion turbine	2
BTU	3	LBS/HR	3	N2 & CO2	3	Internal combustion	3
Gal	4			Steam	4		
Pounds	5						
						Isolated	1
						Parallel	2
						Grid-connected	3

NO..............0
YES............1

APPENDIX B: Data Entry Codes

Appendix C

COGENERATION INVENTORY

List # 1

CONFIRMED COGENERATION

Number of Plants - 30

Capacity - 425.4 MW

Plant Code Number	Capacity (MW)
2	22.0
53	12.0
89	3.0
124	5.0
158	25.0
230	10.0
280	2.7
319	12.0
330	3.5
342	12.0
359	4.0
404	14.0
421	15.0
496	12.5
498	50.0
559	8.8
570	10.0
701	20.0
702	12.5
703	3.5
704	5.0
705	2.0
706	2.0
707	2.1
708	2.0
709	30.0
710	0.5
711	2.4
712	31.9
713	90.0

PLANT CODE NUMBER	PRIM SIC CODE	SEC SIC CODE	SF DY	DY WK	WK YR	UTIL EL	UTIL GS	ELECTRIC LOAD PK DM (MW)	ELECTRIC LOAD AV DM (MW)	ELECTRIC LOAD ANNUAL (MWHR)	STEAM LOAD PK DM (Klbs/hr)	STEAM LOAD AV DM (Klbs/hr)	%OPE LEVE	P1	A1	PK1	P2	A2	PK2	P3	A3	PK3	P4	A4	PK4	DE	DS	SE	SS	BOILER CAPACITY (Klbs/hr)	CAP REPLACE (Klbs/hr)	F T1	FUEL1 QUANTITY
2	2046		3	7	52	4	4	55	49	410000	900	600	100	185	40	40	125	22	22	3	38	38				5	3	3	3	1500	800	3	10000000
53	2900		3	7	52	4	6	5.6	3.6	34944	130	70	100	560	5	5	110	80	75	15	15	20				3	3	3	3	160	0	3	6500
89	2600		3	5.	50	1	1	3.1	2.4	15000	73	58	100	250	55	55	90	15	15	15	30	30				3	3	5	1	80	0	3	93840000
124	2600		3	7	52	2		5.5	3.3	22000	140	105	100	180	75	56	50	25	19							5	5	3	3	170	0	4	66000
158	2046		3	7	52	3		40	30	252000	900	700	100	150	70	65	5	30	35							3	3	3	3	1200	0	3	17500000
230	3316		3	7	52	4	6	95	50	408000	570	470	100	200	100	100										3	5	5	3	570	0		
280	2661																																
319	2900		3	7	52	2	2	54	46	350000	1150	880	100	600	53	56	150	42	40	50	5	4				3	3	3	1	930	0	2	8622012
330			3	7	52	1		5.2	4.4	30000	110	80	100	685	100	100										5	5	5	5	360	0	4	60000
342	2869		3	7	52	10	4	29	24	244000	550	325	100	600	15	12	200	65	60	80	20	28				3	3	3	1	685	0	3	330
359																																	
404	2869		3	7	52	1		16	15	13000	600	500	100	420	100	100										1	3	3	3	750	0	3	1600000
421	2621		3	5.	49	1	1	1	0.7	4368	32	26	100	410	29	30	50	71	70							3	3	3	3	40	0	3	2153850
496	2869	2820	3	7	52	2	12	31	29.5	258200	1300	1155	100	625	95	95	300	3	3	150	1	1	65	39	30	3	3	2	2	1200	0	3	49270000
498	3312																																
559	3500		2	5	49	3		22	15	123000	200	60	100	150	10	5	50	90	95							3	3	3	1	360	0	3	3382000
570	3523		2	5	42	5	5	12	10	36000	240	200	100	175	10	10	8	90	90							1	1	3	1	340	0	3	3150000
701	2900	2800	3	7	52	10	6	85	77	675000	1800	1600	100	160	90	90	15	10	10							3	3	3	3	1950	0	3	60000000
702	2631		3	7	52	10	6																										
703			3	7	52																												
704			3	7	52	3	8																										
705			3	7	52																												
706			3	7	52																												
707	8221		3	7	52	3	8																										
708	7011		3	7	52	3	8																										
709	8221		3	7	52	4	12																										
710			3	7	52	3	7	1.2	1	5735	9	7	100	65	100	100										3	3	3	3	21	0	3	348550
711	8062		3	7	52	5	5																										
712	3211		3	7	52		8																										
713						1																											

APPENDIX C: List 1 Confirmed Cogenerators

PLANT CODE NUMBER	UNI	F T2	FUEL2 QUANTITY	UNI	F T3	FUEL3 QUANTITY	UNI	COAL POSS	REASON NO 1	2	3	4	5	ELEC PROD	SYS TYP	YEAR INSTAL	CAP ELEC (MW)	PROD ANN (MWHR)	PROD PEAK (Klbs/hr)	PROD ANN (Klbs/yr)	QUANTITY FUEL •	UNI	UTIL CON	EXP PLAN	GEN IN PAST	REASON DISCONTINUED	CONS COGEN
2	1	4	268000	2				1						1	1	1937	22	80000	212	1696000			1	1	1	Still operating	1
53	1	7	1200000	4				0	1					1	1	1951	12	10512	130	52500000	8000000	1	2	1			
89	1	2	2316	4	4	20526	2	1						1	1	1966	3	15000	33	170000	20526	2	2	0	1	Still operating	
124	2							1						1	1	1955	5	8700	55	221650	66000	2	2	0	1	Still operating	
158	1	4	300000	2				1						1	1	1949	25	168000	540	3528000	300000	2	2	1	1	Still operating	1
230								0	1		1			1	1	1922	10						2	0	1	Still operating	
280														1			2.7										
319	4	3	57918510	1	16	94276680	1	0	1		1		1	1	1	1949	12	65000	1150	10500			2	0	1	Still operating	0
330	2							1						1	1	1984	3.5		120		60000	2	2	0	0		1
342	1	4	132.5	2										1	1	1940	12		550	325000	35000000	1	2	0		Still operating	
359														1			4										
404	1	1	100000	4	4	220000	2							1	1	1948	14	91728	219	182500	220000	2	2	0	1	Still operating	1
421	1							1	1					1	1	1948	15		32	162240	2153850	1	1	0	1	Still operating	1
496	1	4	515900	2				1						1	1	1953	12	74670	1	1			1	0	1		
498														1			50										
559	1	4	18300	2				1						1	3	1970	8.8	30100	48	167300	4206700	1	1	0			1
570	1	4	49810	2				1						1	1	1928	10	18000	100	168000	1680000	1	2	1	1	Still operating	0
701	1	2	85000000	1				1						1	1	1943	20	60000					1	0	1	Still operating	1
702														1	1	1956	12.5	75000	330		140000	2	3	0			
703														1	1	1972	3.5	7582	40	200000	12825	2	1	0			
704														1	1	1971	5	12428	88	504620	6324792	1	1	0			
705														1	1	1947	2	7000	80	249688	14474	2	1	0			
706														1	1	1952	2	10000	59	342888	4317700	2	1	0			
707														1	3	1966	2.1	7000			1.0E+08	1	1	0			
708														1	3	1974	2	6000			90000000	1	1	0			
709														1	1	1960	30	61318	438	1956822	25000000	1	3	0			
710	1													1	3	1985	0.5	1500	2.4	91	180000	1	2	0			
711														1	3	1971	2.4	8819	10		2038179	1	3				
712														1	1	1955	31.9	56830		1511069			3	0			
713														1			90										
														TOTAL			424.9										

APPENDIX C: List 1 Confirmed Cogenerators

PLANT CODE NUMBER	PLAN TO INST	WHEN	ELEC CAP (MW)	STEAM CAP (KLBS/hr)	REASON REJECTED 1	2	3	4	5	6	7	8	T1 DEGF	RATE1 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T2 DEGF	RATE2 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T3 DEGF	RATE3 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	% ROR
2	1	1	55	800									0																					0
53													0																					0
89													0																					0
124													0																					0
158																																		0
230																																		0
280																																		
319	0				1	1	1				1		0																					0
330	1												0																					0
342													425	400000	1	4	1																	14
359																																		
404	0				1	1				1		1	0																					0
421													0																					0
496						1																												
498																																		
559													0																					0
570													1500	3000	2	2	0	1500	1															0
701	0					1											1																	20
702																																		
703																																		
704																																		
705																																		
706																																		
707																																		
708																																		
709																																		
710																																		
711																																		
712																																		
713																																		

APPENDIX C: List 1 Confirmed Cogenerators

PLANT CODE NUMBER	PYBK YR	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F
2	0	1	48	3		1				2	37	4		2				3	25	4		2				4	20	4		2				5	12	6
53	0	1	44	6	4000000	1	600	560	50	2	44	6	4000000	1	600	560	50																			
89	0	1	37	8	20526	2	250	250	100	2	47	6	0		250	250	0																			
124	0	1	30	4	33000	2	600	600	50	2	30	4	33000	2	600	600	50																			
158	0	1	38	4	100000	2	750	620	32	2	38	4	100000	2	750	620	32	3	33	4	100000	2	750	620	32	4	18	6	1560000	1	750	620	2	5	18	6
230	2	1	60	6			250	200	60	2	24	6			250	200	20	3	24	6			250	200	20											
280																																				
319	0																																			
330	0	1	1	4	60000	2	775	685	100	2	15	3		1	300	175	0	3	15	3		1	300	175	0	4	15	3		1	300	175	0			
342	0	1	45	4	3180	1	650	600	22	2	4	37	660	1	650	600	24	3	37	4	7950000	1	650	600	23	4	37	4	15900000	1	650	600	23	5	49	3
359																																				
404	4	1	25	4	100000	2	900	420	55	2	40	4	70000	2	600	420	22	3	40	4	70000	2	600	420	23	4	8	6		1	600	420	0			
421	0	1	37	3	2153850	1	475	410	70																											
496	2	1	32	12	310000	2	700	625	54	2	26	12	206000	2	700	625	36	3	7	17				625	4.8	4	32	17				300	3.6	5	20	17
498																																				
559	0	1	35	3	1920000	1	150	150	29	2	35	4	8535	2	150	150	25	3	35	4	9740	2	150	150	29	4	20	3	1470000	1	150	150	17			
570	2	1	27	12	6000000	1	600	600	60	2	38	12	4000000	1	175	175	36	3	45	6	500000	1	175	175	4											
701	5	1	40	6	4E+07	1	650	600	31	2	30	6	4E+07	1	650	600	31	3	15	6	50000000	1	650	600	31	4	10	3	4000000	1	650	600	3			
702		1	38	4			475		40	2	28	4			475		40	3	10	6					10	4	10	6					10			
703		1	13	4			300	275	50	2	13	4			300	275	50																			
704		1	14	3			200	150	25	2	14	3			200	150	25	3	11	6			200	150	25	4	11	6			200	150	25			
705		1		4				250	45	2		4				200	45	3	4					250	5	4		4				250	5			
706		1	33	4			300	260	33	2	33	4			300	260	33	3	33	4			300	260	33	4	33	4			300	260	33			
707		1	19	3																																
708		1	20				60	40																												
709		1	13	3			300	175	20	2	13	3			300	175	20	3	13	3			300	175	20	4	29	2			900	150	20	5	23	2
710		1	25	6	116183	1	150	65	33	2	25	6	116183	1	150	65	33	3	25	6	116183	1	150	65	33											
711		1	14	3			100	50	50	2	14	3			100	50	50																			
712																																				
713																																				

APPENDIX C: List 1 Confirmed Cogenerators

PLANT CODE NUMBER	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	ADDITIONAL INFO 1	2	3	4	5	6 ADDITIONAL INFO	ADDITIONAL COMMENTS
2		1				1	1	1	1	1	1	Boilers #1-5, refer to 10 separate units.
53						1	1	1		1	1	(Slop oil= 135,000BTU/gal.)
89							1				1	(Coal at 11,000 BTU/lb.)
124												
158		1	750	620	2				1	1	1	
230							1				1	No information on fuel usage.
280												
319												Add fuel- Petroleum coke 1,756,528 MMBTU.
330												
342	6600000	1	650	600	20							Boilers labeled #4 & 5 are each two boilers.
359												
404												
421												
496				65	1.3							boiler #1 is 3 boilers, boiler #2 is 2 boilers, boiler #3 is 5 boilers
498												
559						1						
570						1	1		1	1	1	Boilers #2 & 3 are each two units combined.
701												boiler #1 is 5 units, #2 is 2 units
702												
703												
704												
705												
706												
707												produces hot water
708												produces hot water info scarce
709			900	200	20							
710						1	1	1	1	1	1	
711												Steam for heat & AC
712												May discontinue cogeneration
713												

APPENDIX C: List 1 Confirmed Cogenerators

List #2

SYSTEMS PRODUCING ELECTRICAL POWER ONLY

Number of Plants - 7

Capacity - 18.2 MW

Plant Code Number	Capacity (MW)
25	0.15
119	2.0
120	12.0
340	0.9
386	0.6
555	2.0
578	0.55

PLANT CODE NUMBER	PRIM SIC CODE	SEC SIC CODE	SF DY	DY WK	WK YR	UTIL EL	UTIL GS	ELECTRIC LOAD PK DM (MW)	ELECTRIC LOAD AV DM (MW)	ELECTRIC LOAD ANNUAL (MWHR)	STEAM LOAD PK DM (Klbs/hr)	STEAM LOAD AV DM (Klbs/hr)	%OPE LEVE	STEAM PRESSURES AND FRACTION OF AVERAGE AND PEAK DEMAND P1	A1	PK1	P2	A2	PK2	P3	A3	PK3	P4	A4	PK4	VARIATION IN STM & ELEC USAGE DE	DS	SE	SS	BOILER CAPACITY (Klbs/hr)	CAP REPLACE (Klbs/hr)	FT1	FUEL1 QUANTITY
25	2869	2819	3	7	52	4	4	3	2.5	17600	11	10	100	100	100	100										5	5	3	3	27	0	3	969720
119	3500		3	5	48	3	8	10	8	56067	30	15	100	150	100	100										3	5	1	3	90	0	3	1780000
120	3321		3	5	49	11		90	42	365488	600	60	100	150	50	50	50	50	50							1	1	1	1	1060	0	3	13160179
340	3400		2	5	50	8		8	6	29456			100	12	100	100										5	3	3	1		0		
386	2819		3	7	52	3	8	10.3	8.8	73865	300	250	100	150	59	59	60	41	41							3	3	3	3	400	0	3	10690000
555	3531		3	5	50	1	1	81	70	380000	0.5	0.3	100	150	100	100										3	3	3	3	0.8	0	3	60000
578	3069		3	5	50	4	4	5	4	269030	60	.17	100	220	50	50	100	50	50							3	3	3	3	140	0	3	1699790

APPENDIX C: List 2 Systems Producing Electrical Power Only

PLANT CODE NUMBER	UNI	F T2	FUEL2 QUANTITY	UNI	F T3	FUEL3 QUANTITY	UNI	COAL POSS	REASON NO 1	2	3	4	5	ELEC PROD	SYS TYP	YEAR INSTAL	CAP ELEC (MW)	PROD ANN (MWHR)	PROD PEAK (Klbs/hr)	PROD ANN (Klbs/yr)	QUANTITY FUEL	UNI	UTIL CON	EXP PLAN	GEN IN PAST	REASON DISCONTINUED	CONS COGEN
25	1							0			1			1	3	1970	0.15		0	0	200	4	1	0	0		1
119	1	1	700000	4				0	1	1				1	3	1984	2	13000	0	0	700000	4	2	0	0		0
120	1	1	163236	4	4	12316	2	1						1	3	1967	12	56448	0	0	113000	4	3	0	1	Peaak shaving	1
340								1						1	3		0.9	648	0	0	18000	4	2	0	1	Stand by	0
386	1	1	29000	4	4	101900	2	1						1	3		0.6	14	0	0	600	4	1		1	Emergency power	1
555	1	2	70000	4	4	79000	2	1						1	3		2	160	0	0				0	0		1
578	1							1						1	3	1955	0.55		0	0		4	1	0	1	Still operating	1

APPENDIX C: List 2 Systems Producing Electrical Power Only

PLANT CODE NUMBER	PLAN TO INST	WHEN	ELEC CAP (MW)	STEAM CAP (KLBS/hr)	REASON REJECTED 1	2	3	4	5	6	7	8	T1 DEGF	RATE1 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T2 DEGF	RATE2 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T3 DEGF	RATE3 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	% ROR
25	1	5	5										0																					15
119													0																					0
120	0					1							0																					20
340	0				1								0																					0
386	1	50	8.6	38									650	62200	2	2	1	460	0	650	79800	2	2	1	460	0	650	81900	2	2	1	460	0	20
555	0				1	1				1			0																					0
578	0					1							0																					15

APPENDIX C: List 2 Systems Producing Electrical Power Only

PLANT CODE NUMBER	PYBK YR	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F
25	2.5	1	5	3	387890	1	200	100	50	2	10	3	58183	200	100	50																				
119	2	1	5	3	600000	1	200	150	33	2	5	3	600000	1	200	150	33	3	5	3	600000	1	200	150	33											
120	0	1	8	8	10000	2	150	150	40	2	6	3	3600000	1	250	150	60																			
340	0																																			
386	3	1	40	4	26500	2	450	150	26	2	37	4	37700	2	450	150	37	3	32	4	37700	2	450	150	37	4	16	3	177300	1	300	150	0			
555	5	1	28	4	25000	2	150	150	25	2	28	4	25000	2	150	150	4	3	8	4	25000	4	150	150	25	4	8	4	25000	4	150	50	25			
578	5	1	13	6	832880	1	450	220	50	2	13	6	832880	1	450	220	50																			

APPENDIX C: List 2 Systems Producing Electrical Power Only

PLANT CODE NUMBER	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	ADDITIONAL INFO 1	2	3	4	5	6	ADDITIONAL COMMENTS
						ADDITIONAL INFO						
25						1	1		1		1	Each boiler capable of 100% steam load.
119							1		1		1	
120												
340												
386						1			1	1	1	
555												
578						1	1					

APPENDIX C: List 2 Systems Producing Electrical Power Only

List #3

SITES PLANNING TO UPGRADE OR INSTALL COGENERATION SYSTEMS

Number of Plants - 27

Capacity - 124.5 MW

Plant Code Number	Capacity (MW)
2	55.0
15	1.3
25	5.0
70	4.0
223	0.0
241	3.2
257	0.0
293	3.0
313	2.0
317	5.4
330	0.0
335	0.0
348	0.0
357	3.7
385	0.0
386	8.6
391	3.0
411	10.0
414	0.0
482	2.8
483	7.5
516	0.0
548	0.0
588	10.0
594	0.0
568	0.0
700	0.0

PLANT CODE NUMBER	PRIM SIC CODE	SEC SIC CODE	SF DY	DY WK	WK YR	UTIL EL	UTIL GS	ELECTRIC LOAD PK DM (MW)	ELECTRIC LOAD AV DM (MW)	ELECTRIC LOAD ANNUAL (MWHR)	STEAM LOAD PK DM (Klbs/hr)	STEAM LOAD AV DM (Klbs/hr)	%OPE LEVE	P1	A1	PK1	P2	A2	PK2	P3	A3	PK3	P4	A4	PK4	DE	DS	SE	SS	BOILER CAPACITY (Klbs/hr)	CAP REPLACE (Klbs/hr)	F T1	FUEL1 QUANTITY
														STEAM PRESSURES AND FRACTION OF AVERAGE AND PEAK DEMAND												VARIATION IN STM & ELEC USAGE							
2	2046		3	7	52	4	4	55	49	410000	900	600	100	185	40	40	125	22	22	3	38	38				5	3	3	3	1500	800	3	10000000
15	3632		3	5	45	4	4	10	9.6	50000	44	18.5	100	100	100	100										3	3	3	1	66	66	3	29000000
25	2869	2819	3	7	52	4	4	3	2.5	17600	11	10	100	100	100	100										5	5	3	3	27	0	3	969720
70	2834		3	7	50	3	8	4.2	3.2	26000	60	39	100	30	20	30	45	40	30	150	40	40				3	3	3	3	120	60	3	3800000
223	2000		3	7	52	3	8	85	71	37291	45	22	100	200	15	15	125	35	5	35	30	45	15	20	35	5	5	3	1	130	0	3	3438327
241	2821	2833	3	7	51	3	8	4	3.2	27000	120	75	100	200	15	20	125	20	20	70	65	60				3	3	3	1	250000	0	3	8000000
257	2000		3	5	52	2		5.8	4.4	26400	60	45	100	150	100	100										1	5	5	1	60	0	4	14000
293	2800		3	7	52	3	8	9	5.5	48000	100	35	100	300	15	5	150	80	90	37	15	5				3	3	3	1	200	0	3	8000000
313	2000		3	5	49	3	8	5.1	4.5	28000	40	20	100	150	25	25	80	25	25	25	50	50				5	5	3	3	90	0	3	2100000
317	2000		3	5	50	3	9	9.5	8	50000	55	30	85	150	50	30	100	30	30	25	10	10	10	10	30	3	3	1	3	60	55	3	2500000
330			3	7	52	1		5.2	4.4	30000	110	80	100	685	100	100										5	5	5	5	360	0	4	60000
335	2911		3	7	52	3	8	41.5	35.5	311260	700	600	100	600	100	100										3	3	2	1	1950	0	1	3.4E+11
348	3569	3429	2	5	50	4	4	6.2	4.5	1982	6	2	100	100	100	100										3	1	3	1	50000	0	3	719000
357	2050		3	5	52	3	8	12.5	9.5	51514	70	40	100	100	30	20	30	70	80							3	3	1	1	158	0	3	2189677
385	3351	3482	3	7	49	4	6	40	30	250000	150	65	100	135	60	80	20	40	20							3	3	3	1	140	0	3	388000
386	2819		3	7	52	3	8	10.3	8.8	73865	300	250	100	150	59	59	60	41	41							3	3	3	3	400	0	3	10690000
391	2011		3	7	52	3	9	6.2	4	42388	35	21	100	220	5	5	110	95	95							1	1	3	3	75	5	3	1440000
411	2816		3	7	52	10	6	5.5	5	36600	130	80	100	100	75	60	150	25	40							5	3	5	1	240	50	4	45000
414	2600		3	6.	50	3	8	4.5	3.2	25000	100	70	100	120	100	100										3	3	3	3	95	0	3	4500000
482	2013		2	5	52	8	8	5.1	4.6	19552	27	24	100	15	100	100										5	5	5	5	100	0	3	1814830
483	3661		2	6	50	3	8	10	9	57240	70	30	100	10	100	100										3	3	1	1	100	0	3	1684000
516	2067	2834	3	7	52	3	8	9.5	4.8	20750	20	16	100	140	10	10	90	10	10	60	30	30	50	50		1	3	1	3	60	0	3	1380000
548			3	7	52	3	8	23	12	128000	224	110	100	190	20	16	15	80	84							1	3	1	1	510	0	3	3000000
568	3700		2	5	50	3		16	11	55000	175	75	100	150	100	100										3	3	3	1	400	0	3	835870
588	3522		1	5	46	5	5	9	6	23410	0	0	100	0												1		3		0	0	3	3810000
594	3391		2	5	48	3	8	4.1	4	10124	150	115	100	130	95	98	15	5	2							3	3	1	1	240	0	3	4651600
700	3200		3	7	52	3		4	2.5	18000	0	0	100													5		5		0	0	4	120000

APPENDIX C: List 3 Sites Planning To Upgrade or Install Cogeneration Systems

PLANT CODE NUMBER	UNI	F T2	FUEL2 QUANTITY	UNI	F T3	FUEL3 QUANTITY	UNI	COAL POSS	REASON NO 1	2	3	4	5	ELEC PROD	SYS TYP	YEAR INSTAL	CAP ELEC (MW)	PROD ANN (MWHR)	PROD PEAK (Klbs/hr)	PROD ANN (Klbs/yr)	QUANTITY FUEL	UNI	UTIL CON	EXP PLAN	GEN IN PAST	REASON DISCONTINUED	CONS COGEN
2	1	4	268000	2				1						1	1	1937	22	80000	212	1696000			1	1	1	Still operating	1
15	1	9	117316	4				1	1					0											0	peak shaving only	1
25	1							0			1			1	3	1970	0.15		0	0	200	4	1	0	0		1
70	1							1	1		1			0											0		1
223	1	2	11918	4				0	1	1	1	1		0											0		1
241	1							1						0											0		1
257	2							1						0											1	Cheaper to buy	1
293	1	16	500000	4				0	1	1				0											0		1
313	1							0			1	1		0											0		1
317	1							0	1				1	0											0		1
330	2							1						1	1	1984	3.5		120		60000	2	2	0	0		1
335	3	3	3.9E+11	3	16	1.8E+13	3	0	1	1				0											0		1
348	1							0	1	1	1			0											1	Outdated equipment	1
357	1	15	3669000	1				0	1		1			0											0		1
385	1							0					1	0											1	Steam vol.<turbo gen	1
386	1	1	29000	4	4	101900	2	1						1	3		0.6	14	0	0	600	4	1		1	Emergency power	1
391	1	14	360000	1				0				1		0											0		1
411	2													0											0		1
414	1							0	1	1	1			0											0		1
482	1							0	1	1		1		0											0		1
483	1							0	1		1			0											0		1
516	1							0	1	1		1		0											0		1
548	1	4	30000	2				1																	0		1
568	1	4	17000	2				1						0											0		1
588	1	1	100000	1	11	8.0E+10	3	0	1		1			0											0		1
594	1							0	1	1				0											1	Cheaper to buy	1
700	2							1						0											0		1

APPENDIX C: List 3 Sites Planning To Upgrade or Install Cogeneration Systems

PLANT CODE NUMBER	PLAN TO INST	WHEN	ELEC CAP (MW)	STEAM CAP (KLBS/hr)	REASON REJECTED 1	2	3	4	5	6	7	8	T1 DEGF	RATE1 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T2 DEGF	RATE2 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T3 DEGF	RATE3 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	% ROR
2	1	1	55	800									0																					0
15	1	1	1.3	0																														
25	1	5	5										0																					15
70	1	4	4	50									485			2	0	485	0															0
223	1	2	0	0									0																					10
241	1	2	3.2	60									900			1	0		0	900			1	0		0	900			1	0		0	0
257	1	50											0																					0
293	1	3	3										1600	3E+07	1	1	0		1	680	7000000	1	1	0		1	800	14000000	1	1	0		1	25
313	1	3	2										410	4000	2	1	0		0	350	20000	2		0		1								0
317	1	1	5.4										450			1	0		0															35
330	1												0																					0
335	1	50											600	56200	3	1	0		0	640	160500	3	1	0		0	450	1413000	3	1	0		1	20
348	1	50	0	0													1																	15
357	1	3	3.7	18.3									0																					15
385	1	50											0																					25
386	1	50	8.6	38									650	62200	2	2	1	460	0	650	79800	2	2	1	460	0	650	81900	2	2	1	460	0	20
391	1	2	3	8									500				1	1	0															15
411	1	50	10																															15
414	1	50											0																					0
482	1	1	2.8	15										0																				25
483	1	2	7.5										0																					0
516	1	50											0																					30
548	1	3											0																					0
568	1	50											0																					0
588	1	2	10				1						2200	5E+07	1	2	1	1200	1															35
594	1	50			1	1	1	1	1				0																					0
700	1	2		100									1200	580000	3		0		0															25

APPENDIX C: List 3 Sites Planning To Upgrade or Install Cogeneration Systems

PLANT CODE NUMBER	PYBK YR	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F
2	0	1	48	3		1				2	37	4		2				3	25	4		2				4	20	4		2				5	12	6
15		1	46	3	425685	1	165	100	25	2	46	3	425685	1	165	100	25	3	50	3	425685	1	165	100	25	4	51	3	425685	1	165	100	25			
25	2.5	1	5	3	387890	1	200	100	50	2	10	3	58183	200	100	50																				
70	2	1	33	8	950000	1	250	150	25	2	33	6	950000	1	250	150	25	3	33	6	1900000	1	250	150	50											
223	0	1	20	6	2005	1	250	195	33	2	20	6	2007	1	250	195	34	3	20	6	2007	1	250	195	33											
241	3	1	9	6	6000000	1	250	200	80	2	18	6	1500000	1	250	200	18	3	35	6	250000	1	250	200	1	4	35	6	250000	1	250	200	1			
257	3	1	60	4	4666	2	225	150	33	2	60	4	4667	2	225	150	33	4	60	4	4667	2	225	150	33	4	17	6		1	225	150	0	5	17	6
293	5	1	15	3	720000	1	325	300	20	2	15	3	720000	1	325	300	20	3	15	3	720000	1	325	300	20	4	6	3	2880000	1	325	300	80			
313	2	1	30	6	1800000	1	160	150	100	2	17	6		1	175	150	0																			
317		1	19	6	2500000	1	150	150	100	2	18	6		1	150	150		3	15	6		1	150	150												
330	0	1	1	4	60000	2	775	685	100	2	15	3		1	300	175	0	3	15	3		1	300	175	0	4	15	3		1	300	175	0			
335	3.5	1	14	1	2E+12	3	600	600	28	2	14	16	3E+12	3	600	600	40	3	14	6	2.5E+12	3	600	600	32											
348	2	1	25	6	539250	1	100	100	75	2	14	6	179750	1	100	100	25																			
357	0	1		6		1	250	100		2		15		1	250	100																				
385	2	1	2	3	320000	1	150	135	80	2	1	3	80000	1	150	135	20																			
386	3	1	40	4	26500	2	450	150	26	2	37	4	37700	2	450	150	37	3	32	4	37700	2	450	150	37	4	16	3	177300	1	300	150	0			
391	0	1	20	6	720000	1	250	220	50	2	5	6	720000	1	250	220	50	3	1	13	360000	1	250	220	5											
411	0	1	35	4	38000	2	300	275	80	2	45	4	7000	2	150	150	15	3	10	3	370000	1	300	275	5											
414	0	1	40	3	2250000	1	125	120	50	2	25	3	2250000	1	125	120	50																			
482	0	1	12	3	127038	1	35	15	70	2	12	3	54445	1	35	15	30	3	12	3	0	1	35	15	0	4	12	3	0	1	35	15	0			
483	30	1	25	6	336800	1	15	10	20	2	25	6	336800	1	15	10	20	3	25	6	336800	1	15	10	20	4	22	6	336800	1	15	10	20	5	22	6
516	0	1	30	6	460000	1	250	140	34	2	30	6	460000	1	250	140	33	3	10	6	460000	1	250	140	33											
548	4	1	36	3	3000000	1	200	200	25	2	21	4	30000	2	200	200	70	3	36	3	0		200	200	0	4	36	3	0		200	200	0	5	25	3
568	5	1	21	4	4250	2	200	150	25	2	21	4	4250	2	200	150	25	3	21	4	4250	2	200	150	25	4	21	3	835870	1	200	150	25			
588	3																																			
594	2	1	40	6	744260	1	150	130	16	2	40	6	744260	1	150	130	16	3	40	6	744260	1	150	130	16	4	30	6	2232770	1	150	130	52			
700	4																																			

APPENDIX C: List 3 Sites Planning To Upgrade or Install Cogeneration Systems

PLANT CODE NUMBER	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	ADDITIONAL INFO						ADDITIONAL COMMENTS
						1	2	3	4	5	6	
						ADDITIONAL INFO						
2		1				1	1	1	1	1	1	Gas usage is $75,000/ year.
15						1			1	1	1	Steam demand too small to consider cogeneration.
25						1	1		1		1	Each boiler capable of 100% steam load.
70						1	1	1	1	1	1	
223							1		1	1	1	Steam for heat only.
241						1	1		1	1	1	
257		1	225	150	0	1	1	1	1	1	1	
293							1	1	1	1	1	Boilers #1 & 4 also burn creosote (150,000 BTU/gal.)
313						1	1		1	1	1	
317						1	1	1	1	1	1	
330												Boiler #1 is four units combined.
335						1	1				1	Currently investigating cogeneration
348						1	1	1	1	1	1	
357												Cogen. has not been evaluated. #3 waste heat stream goes through boiler.
385						1	1		1	1	1	No process steam.
386						1			1	1	1	
391						1			1	1	1	
411						1	1		1		1	
414												
482						1	1	1		1	1	
483	336800	1	15	10	20	1	1	1	1	1	1	
516						1	1		1	1	1	
548	0		200	200	0	1	1	1	1	1	1	Produces hot water info scarce
568							1				1	
588							1	1	1		1	
594						1	1	1				
700						1	1	1			1	

APPENDIX C: List 3 Sites Planning To Upgrade or Install Cogeneration Systems

List #4

UNCONFIRMED COGENERATORS

Number of Plants - 3

Capacity - 11.2 MW

Plant	Estimated Capacity (MW)
Boone Valley Cooperative Processing 406 No. Commercial P.O. Box 85 Eagle Grove, IL 50533	10.0
Meadowmart Shopping Center Rockford, IL	1.2
Northeastern Steel & Wire Edwardsville Rd. Granite City, IL 62040	-

List #5

PLANTS CLOSED

Number of Plants - 3

Capacity - 61.0 MW

Plant	Capacity (MW)
Celotex Corporation 2226 W. clarke St., Peoria IL 61601	5.5
Tollway, North Office 100 Wilmot Rd., Deerfield IL 60015	3.0
Western Electric 22nd Cicero Ave., Cicero IL 60650	52.5

Appendix D

PLANT RESPONSES

PLANT CODE NUMBER	PRIM SIC CODE	SEC SIC CODE	SF DY	DY WK	WK YR	UTIL		ELECTRIC LOAD			STEAM LOAD		%OPE LEVE	STEAM PRESSURES AND FRACTION OF AVERAGE AND PEAK DEMAND												VARIATION IN STM & ELEC USAGE				BOILER CAPACITY (Klbs/hr)	CAP REPLACE (Klbs/hr)	F T1	FUEL1 QUANTITY
						EL	GS	PK DM (MW)	AV DM (MW)	ANNUAL (MWHR)	PK DM (Klbs/hr)	AV DM (Klbs/hr)		P1	A1	PK1	P2	A2	PK2	P3	A3	PK3	P4	A4	PK4	DE	DS	SE	SS				
2	2046		3	7	52	4	4	55	49	410000	900	600	100	185	40	40	125	22	22	3	38	38				5	3	3	3	1500	800	3	10000000
4	3312	3312	3	5	48	3	9	10	7.5	45700	18	12	100	115	100	100										1	1	5	5	12	0	3	6148000
6	3274		1	5	50	3	8	3.3	3	6000	0	0	100													5		3		0	0	3	3500000
7	3448		1	5	50	3	8	3.5	2	9500	13	5	100	85	100	100										3	3	3	1	28	0	3	640000
9	2833	2834	3	7	52	3	8	18	15	92561	123	54	100	150	100	100										3	3	3	1	210	0	3	156000
15	3632		3	5	45	4	4	10	9.6	50000	44	18.5	100	100	100	100										3	3	3	1	66	66	3	29000000
19	2800	9900	3	5	52	3	8	1.7	1.6	10094	94	60	100	170	100	100										3	3	3	1	170	0	3	5300000
24	2819		3	7	50	2	10	14	11	100000	40	20	100	90	20	20	45	60	60	15	20	20				3	3	3	3	54	0	3	3310000
25	2869	2819	3	7	52	4	4	3	2.5	17600	11	10	100	100	100	100										5	5	3	3	27	0	3	969720
27	3312		3	5	52			12.5	12	50000	0	0	100													3		3		0	0		
35	3411		3	5	49	3	4	4.4	4.1	20927	52	20.5	100	75	88	95	15	12	5							5	5	5	1	158	70	3	2.8E+11
53	2900		3	7	52	4	6	5.6	3.6	34944	130	70	100	560	5	5	110	80	75	15	15	20				3	3	3	3	160	0	3	6500
57	2099		2	5.	50	3	8	1.5	1.1	5500	12	10	100	20	15	10	3	85	90							3	3	3	3	12.6	0	3	258000
67	2818		3	7	52	3	8	2.5	2.1	18400	75	60	100	150	75	80	300	25	20							5	3	5	3	85	0	3	4790000
69	3079		3	6	52	8		0.8	0.7	3423	6	4.4	100	125	70	70										3	5	3	1	6	0	3	550
70	2834		3	7	50	3	8	4.2	3.2	26000	60	39	100	30	20	30	45	40	30	150	40	40				3	3	3	3	120	60	3	3800000
72	2045	2099	1	5	49	3		0.3	0.3	508	0.1	0.05	100	40	100	100										5	5	5	5	0.15	0	3	365
77	3714		3	6	52	3	8	2.5	2.5	11525	11	11	100	10	100	100										5	5	5	1	22	0	3	13068
80	2821	2869	3	7	52	1	1	11	9	65000	125	80	100	220	80	85	100	20	15							3	3	1	1	200	100	3	8500000
82	3479		3	5	52	3	9	1.36	1.13	5797	13	6.5	100	8	100	100										3	1	3	1	14		3	2033921
84	2013		1	5	52	2	2	0.38	0.32	1529	12	6	100	65	100	100										3	3	3	3	14	0	3	135
85	2020	2040	3	6	52	4	4	1.4	1.3	7900	17	12	100	12	67	50	135	33	50							3	3	3	3	34.5	0	3	416900
89	2600		3	5.	50	1	1	3.1	2.4	15000	73	58	100	250	55	55	90	15	15	15	30	30				3	3	5	1	80	0	3	93840000
91	3079	3412	3	5	50	3	8	3	2.5	13278	0	0														3		3		0	0	3	763200
93	3316		2	6	50	3	8	1.6	1.4	5880	24	10	100	45	100	100										3	3	5	1	36	0	3	1003453
95	2821		3	7	52	4	4	12	9	83300	130	90	100	175	70	60	30	30	40							5	5	3	1	205	0	3	8967200
98	2842		3	5	52	3	8	1	0.7	5644	1	1	100	100	10	10	50	10	10	15	80	80				3	3	3	1	3	0	3	620400
101	2065		3	5	50	3	8	0.32	0.27	6488	5	4.8	100	115	100	100										2	3	3	2	2.5	0	3	532900
103	3400	3400	2	5	51	4	4	2.6	2.5	10000	15	6	100	12	80	85	75	20	15							1	1	3	1	50	0	3	1200000
110	2000		1	5	52	3	8	0.4	0.4	832	0.05	0.04	100													1	1	1	3	0.125	0		
111	3652		3	5	52	4	11	2	1.5	7500	27	18	100	160	100	100										5	5	3	3	45	0	3	1440000
115	2023		3	5	52	4	4	2.7	2.4	15600	18	7	100	150	100	100										3	3	3	3	18	0	3	36000
116	2000		1	5	52	3		0.3	0.3	658	8	5	100	135	100	100										3	3	5	5	30	0	3	182400
117	2283		3	6	48	6	8	2.8	2.5	13340	60	30	100	135	100	100										3	3	1	1	80	0	3	2600000
119	3500		3	5	48	3	8	10	8	56067	30	15	100	150	100	100										3	5	1	3	90	0	3	1780000
120	3321		3	5	49	11		90	42	365488	600	60	100	150	50	50	50	50	50							1	1	1	1	1060	0	3	13160179
124	2600		3	7	52	2		5.5	3.3	22000	140	105	100	180	75	56	50	25	19							5	5	3	3	170	0	4	66000
130	0		1	5	50	7		0.2	0.2	311	4	3.5	40	10	40	80										5	5	3	1	9	0	3	66903
133	2026		1	5	52	4		2.2	2	475	0.1	0.1	100	60	46	54	70	46	54							5	3	3	3	0.2	0	3	60000
135	2079		1	5	52	3	9	0.3	0.25	460	8	5	100	12	100	100										5	3	5	3	10	0	3	150000
140	3462		1	5	50	4	4	2.4	1.9	4000	80	40	75	105	95	95	15	5	5							1	1	1	1	130	0	3	2000
147	2600		3	5	52	3	8	0.8	0.7	300	12	10	100	180	100	100										5	5	3	3		0	3	5600000
153	2048		3	5	52	3		2.3	2.3	5000	15		100	140	100	100										3	3	1	1	40	0	3	1000000
158	2046		3	7	52	3		40	30	252000	900	700	100	150	70	65	5	30	35							3	3	3	3	1200	0	3	17500000
160	2821		3	7	53	3	8	2.2	1.8	14800	10	6	100	150	100	100										5	5	5	1	0	0	3	801500
162	4130		3	7	52	9	2	2.6	2.4	18000	12	8	100	25	100	100										5	1	1	1	17.5	0	3	450000
171	2899		1	5	52	3	8	1	0.9	3390	18	4	100	30	58	91	100	42	8							3	3	1	1	22	0	3	380800

APPENDIX D: Plant Responses

PLANT	PRIM	SEC	SF	DY	WK	UTIL		ELECTRIC LOAD			STEAM LOAD		%OPE	STEAM PRESSURES AND FRACTION OF AVERAGE AND PEAK DEMAND												VARIATION IN STM & ELEC USAGE				BOILER	CAP	F	FUEL1
CODE NUMBER	SIC CODE	SIC CODE	DY	WK	YR	EL	GS	PK DM (MW)	AV DM (MW)	ANNUAL (MWHR)	PK DM (Klbs/hr)	AV DM (Klbs/hr)	LEVE	P1	A1	PK1	P2	A2	PK2	P3	A3	PK3	P4	A4	PK4	DE	DS	SE	SS	CAPACITY (Klbs/hr)	REPLACE (Klbs/hr)	T1	QUANTITY
178	2851	3471	2	5	52	3		0.001																									
180	2800		1	5	52	3		0.2	0.1	280	0	0	100	0												3		3		0	0	3	19000
181	2085		2	5	50	3		0.7	0.6	2500	17	8	100	15	100	100										3	1	5	3	34	0	3	550000
186	2090		3	7	50	3	8	1.3	1	8000	25	15	100	150	70	70	30	30	30							3	1	1	3	34.5	0	3	1465000
188	2892	2819	3	7	52	3	8	2.5	2	16000	60	12	100	250	85	85	100	15	15							3	3	3	3	120	0	3	1300000
193	2161	3700	3	5	52	4	4	1.1	1	5100	28	14	100	100	100	100										3	3	3	1	28	0	3	343638
197	2851		3	5	50	3	8	2.5	1.5	2864	8	6	100	35	75	75	7	25	25							3	1	1	1	15	0	3	371590
204	3635		1.	5	50	4	8	3.7	2.6	20000	48	15	100	100	30	30	30	40	40	15	30	30				3	3	3	1	48	0	3	1850000
209	2011		1	5	48	3		1.1	1	1925			100	13	100	100										5	5	3	3	10	0	3	215600
210	2098		3	5	50	3	8	0.6	0.5	2500	4	2.6	100	50	100	100										3	3	5	3	27	0	3	366000
211	2600		3	7	50	3	8	10	9	79700	112	90	100	400	10	10	150	50	50	75	23	23	50	17	17	5	3	5	1	220	0	3	7900000
215	2819		3	7	52	3	8	0.5	0.3	2500	5	4	50	100	100	100										3	1	1	1	25	0	3	52260
216	3621		3	5	48	3	8	4	3.8	17700	16	4	100	12	100	100										3	1	5	1	35	0	3	238000
219	2099		2	5	50	3	9	4.6	2.8	16000	25	15	100	100	100	100										3	1	1	1	40	0	3	750000
223	2000		3	7	52	3	8	85	71	37291	45	22	100	200	15	15	125	35	5	35	30	45	15	20	35	5	5	3	1	130	0	3	3438327
227	2079		3	7	50	3	8	80	66	25000	120	60	100	160	100	100										3	5	3	1	2000	0	3	6000000
230	3316		3	7	52	4	6	95	50	408000	570	470	100	200	100	100										3	5	5	3	570	0		
241	2821	2833	3	7	51	3	8	4	3.2	27000	120	75	100	200	15	20	125	20	20	70	65	60				3	3	3	1	250000	0	3	8000000
244	2400		2	5	52	3	8	1.2	1	4200	17	11	100	180	67	67	30	33	33							5	5	3	3	21	0	3	647400
247	3822		1	5	52	3	8	3.3	2.5	11000	0	0	100													5		1			0	3	190000
252	3900		1	5	50	3	8	0.9	0.8	1700	0.3	0.2	100	10	100	100										3	5	3	5	250	0	3	213600
254	2934		2	4	49	3	8	1.1	1	4800	4.5	1.5	100	10	100	100										3	1	3	1	13.3	0	3	500000
255	2661		1	4	50	3	8	0.1	0.1		0.3	0.3	50	75	100	100										5	5	3	1	1	0	3	
257	2000		3	5	52	2		5.8	4.4	26400	60	45	100	150	100	100										1	5	5	1	60	0	4	14000
264	2800		3	5	52	3	9	1	0.5	5000	14	4	60	14	90	100										1	1	3	5	28	0	3	460000
269	2653		3	5	52	3	8	1.2	0.9	5600	24	15	100	175	100	100										5	3	5	3	48	48	3	1000000
277			3	6	33	4	4	0.6					100	100	100	100										1	3	1	1		0		
280	2661																																
285	2871		3	7	52	3	8	1.8	1.7	14851	70	30	100	200	100	100										3	5	3	1	140	0	3	2430000
287	2077		2	5.	52	3		0.4	0.3	1561	10	8	100	100	100	100										3	3	3	3	20	0	3	650355
293	2800		3	7	52	3	8	9	5.5	48000	100	35	100	300	15	5	150	80	90	37	15	5				3	3	3	1	200	0	3	8000000
295	2038		3	5	52	2		2.2	2	13000	15	8	100	125	100	100										3	3	3	3	35	0	3	36000000
303	3300		3	6	52	10	6	120	60	565000	35	22.8	100	250	100	100										1	3	3	1	0	0	1	275700
313	2000		3	5	49	3	8	5.1	4.5	28000	40	20	100	150	25	25	80	25	25	25	50	50				5	5	3	3	98	0	3	2100000
317	2000		3	5	50	3	9	9.5	8	50000	55	30	85	150	50	30	100	30	30	25	10	10	10	10	30	3	3	1	3	60	55	3	2500000
319	2900		3	7	52	2	2	54	46	350000	1150	880	100	600	53	56	150	42	40	50	5	4				3	3	3	1	930	0	2	8622012
320	3599	3443	2	5	48	3	8	0.6	0.5	1956	2	1.2	100	10	100	100										3	5	3	1		0	3	418275
323	3315																																
324	5091		2.	6	52	3	9	5	4.4	25	64	38	100	120	95	95										1	3	3	1	115	0	3	999235
325	3645	3646	1	5	52	3	8	1.5	1.4	5842	0	0	100													3		1		0	0		
327	3643		3	5	52	3	8	2.1	1.2	10500	12	4.5	100	70	55	85	165	45	15							3	3	3	1	31	0	3	515000
328	3643		2	5	52	3	8	2.4	1.2	10700	5.5	1.7	100	35	100	100										3	3	3	1	20.5	10.2	3	250000
330			3	7	52	1		5.2	4.4	30000	110	80	100	685	100	100										5	5	5	5	360	0	4	60000
335	2911		3	7	52	3	8	41.5	35.5	311260	700	600	100	600	100	100										3	3	2	1	1950	0	1	3.4E+11
340	3400		2	5	50	8		8	6	29456			100	12	100	100										5	3	3	1		0		
342	2869		3	7	52	10	4	29	24	244000	550	325	100	600	15	12	200	65	60	80	20	28				3	3	3	1	685	0	3	330
348	3569	3429	2	5	50	4	4	6.2	4.5	1982	6	2	100	100	100	100										3	1	3	1	50000	0	3	719000

PLANT CODE NUMBER	PRIM SIC CODE	SEC SIC CODE	SF DY	DY WK	WK YR	UTIL EL	UTIL GS	ELECTRIC LOAD PK DM (MW)	ELECTRIC LOAD AV DM (MW)	ELECTRIC LOAD ANNUAL (MWHR)	STEAM LOAD PK DM (Klbs/hr)	STEAM LOAD AV DM (Klbs/hr)	%OPE LEVE	P1	A1	PK1	P2	A2	PK2	P3	A3	PK3	P4	A4	PK4	VARIATION IN STM & ELEC USAGE DE	DS	SE	SS	BOILER CAPACITY (Klbs/hr)	CAP REPLACE (Klbs/hr)	F T1	FUEL1 QUANTITY
351	2873		3	7	52	11	8	12	12	96000	400	400	100	450	70	70	115	10	10	45	20	20				5	5	5	5	200	0	3	1.1E+08
357	2050		3	5	52	3	8	12.5	9.5	51514	70	40	100	100	30	20	30	70	80							3	3	1	1	158	0	3	2189677
359																																	
363	3411		3	7	52	3	8	2	1.5	7884	25.9	8.6	100	10	100	100										3	3	3	1	25.9	0	2	30280
367	2821	2891	3	5	52	2	2	2.6	1.9	17000	50	19	80	150	10	20	120	90	80							3	1	3	1	80	0	3	2500000
370	2891		1	5	52	3	9	0.6	0.4	770	5	3	100	125	100	100										3	3	3	3	125	0		
373	3317		2	5	52	3	8	0.6	0.5	1643	0	0	100	0												3		5		0	0	3	114545
376	2000		3	5	48	4		2.9	2.8	12000	120	100	100	200	100	100										5	5	5	5	200	0	3	51360000
378	3633		3	5	50	2	2	4.6	3.2	17000	17.5	12.5	100	35	100	100										1	3	3	1	50	0	3	600000
380	2869		2.	7	52	3	8	70	66	539000	990	920	100	600	50	54	150	20	20	50	30	26				5	5	5	5	1250	0	3	1.3E+08
385	3351	3482	3	7	49	4	6	40	30	250000	150	65	100	135	60	80	20	40	20							3	3	3	1	140	0	3	388000
386	2819		3	7	52	3	8	10.3	8.8	73865	300	250	100	150	59	59	60	41	41							3	3	3	3	400	0	3	10690000
389	2011		1	5	52	2	2	4.8	2.8	24400	44	30	100	125	90	85	35	10	15							3	5	1	5	80	0	3	236000
391	2011		3	7	52	3	9	6.2	4	42388	35	21	100	220	5	5	110	95	95							1	1	3	3	75	5	3	1440000
404	2869		3	7	52	1		16	15	13000	600	500	100	420	100	100										1	3	3	3	750	0	3	1600000
411	2816		3	7	52	10	6	5.5	5	36600	130	80	100	100	75	60	150	25	40							5	3	5	1	240	50	4	45000
414	2600		3	6.	50	3	8	4.5	3.2	25000	100	70	100	120	100	100										3	3	3	3	95	0	3	4500000
415	3475		3	5	52	3	8	1.8	1.5	9800	26	20	100	30	100	100										5	5	5	5	60	0	3	3000000
419	2800		3	7	52	3	9	2	1.5	12000	25	18	100	150	50	36	50	50	64							3	3	3	3	50	20	3	1000000
421	2621		3	5.	49	1	1	1	0.7	4368	32	26	100	410	29	30	50	71	70							3	3	3	3	40	0	3	2153850
422	2043		3	5	50	4	4	3.7	2	17500	29	13	100	250	100	100										3	3	3	3	45	0	3	4600
424			2	6	52	3		3.4	3.2	18997			100	35	100	100										3	3	1	1	102	0	3	456846
430	2821		3	7	52	3	8	0.9	0.9	5971	20	9.3	100	240	1	0	100	40	50	60	39	40	25	20	10	5	5	5	1	100	0	3	1.1E+09
433	3400		3	5.	50	4	4	2	1.6	10397	24	5	100	90	100	100										5	1	5	1	48	0	3	412000
434	3353	3398	3	7	52	3	8	45	34	251450	99.8	72	100	150	25	5	35	75	95							3	5	5	1	230	0	3	42420000
446	3472		3	5	48	7		2	1.6	9300	30	7.5	100	125	25	25	70	50	50	15	25	25				1	1	1	1	34	0	3	2165220
448	2000		2	5	50	3	8	1	0.9	5100	23.2	14.5	100	80	13	13	15	87	87							5	3	3	1	29	0	3	991600
453	4226		3	5	52			0.54	0.48	1642	20	4	100	125	100	100										1	3	5	1	68	0	3	949045
454	2879		2	5	52	3	8	1.8	0.8	7114	0	0	100													1		1		0	0	3	236078
462	3355		1	5	52	2	3	1.3	1	2288	7	4	100	15	100	100										1	1	3	1	7	0	3	54120
467	2841	2869	3	7	52	3	8	10.3	8.6	74400	120	36	100	220	25	25	100	50	50	85	10	10	45	15	15	5	1	3	3	180	0	3	6250000
473	2033		2	6.	20	2	2	0.9	0.4	1550	62	58	100	100	100	100										5	5	5	5	68	0	3	865560
482	2013		2	5	52	8	8	5.1	4.6	19552	27	24	100	15	100	100										5	5	5	5	100	0	3	1814830
483	3661		2	6	50	3	8	10	9	57240	70	30	100	10	100	100										3	3	1	1	100	0	3	1684000
488	3316	7150	3	5.	50	3	8	3.4	3	14930	14	10	100	15	100	100										3	3	5	3	18	0	3	1782000
495	2600		1	5	52	1		0.6	0.4	1190	0	0	100													3	1	3	1	12	0	3	221052
496	2869	2820	3	7	52	2	12	31	29.5	258200	1300	1155	100	625	95	95	300	3	3	150	1	1	65	39	30	3	3	2	2	1200	0	3	49270000
497	3300	3315	1	5	48	3	8	8	2	16500	14	5	100	85	20	100	50	80	0							1	3	1	1	48	0	3	3026900
498	3312																																
500	2899		3	6	50	3	8	1.6	1.3	8000	5	1.8	100	15	100	100										5	5	3	1	5.2	0	3	125000
505	2869	2819	3	7	52	3	8	1.1	0.9	7500	35	22	100	135	100	100										3	3	3	1	100	0	3	3150000
507	2815		1	5	52	3		0.2	0.2	276	17.5	4	100	125	33	72	35	67	28							3	3	1	1	17.5	0	3	386
510	2040		3	5	50	4	4	1	0.9	2700	22	8	35	120	15	6	40	85	94							1	1	1	1	44	0	3	600000
511	3952		3	5	52	3		0.5	0.4	2500	5	3	100	100	100	100										3	3	1	1	6	0	3	570000
512	2873		3	5	39	1	1	2	1.4	7000	9	3	100	100	100	100										1	1	1	1	12	0	3	800000
513	2087		1	5	52	3		0.5	0.4	1872	0.1	0.1	100	100	100	100										5	3	5	1	1	0	3	558186
516	2067	2834	3	7	52	3	8	9.5	4.8	20750	20	16	100	140	10	10	90	10	10	60	30	30	50	50		1	3	1	3	60	0	3	1380000

PLANT CODE NUMBER	PRIM SIC CODE	SEC SIC CODE	SF DY	DY WK	WK YR	UTIL EL	UTIL GS	ELECTRIC LOAD PK DM (MW)	ELECTRIC LOAD AV DM (MW)	ELECTRIC LOAD ANNUAL (MWHR)	STEAM LOAD PK DM (Klbs/hr)	STEAM LOAD AV DM (Klbs/hr)	%OPE LEVE	P1	A1	PK1	P2	A2	PK2	P3	A3	PK3	P4	A4	PK4	DE	DS	SE	SS	BOILER CAPACITY (Klbs/hr)	CAP REPLACE (Klbs/hr)	F T1	FUEL1 QUANTITY
521	3600		3	7	52	3	8	4.5	2.7	24000	60	20	100	20	5	2	10	45	28	5	50	70				3	3	1	1	100	0	3	1500000
531	2869	2821	3	7	52	3	8	1.5	1.4	8133	50	30	100	150	35	35	90	25	25	80	10	10	30	30	30	5	5	5	1	170	0	3	3665000
533	2067		2	5	52	3		5	4.4	25634	45	36	100	130	3	2	15	97	98							5	5	3	1	100	0	3	1586020
537	3400		3	5.	49	3	9	2.3	1.9	12109	0.2	0.1	100	12	100	100										1	5	1	3	0.3	0	3	879946
544	2600		3	7	52	3	8	55	51	43000	36	30	100	175	70	70	50	20	20	15	10	10				3	5	1	3	114	0	3	4112950
545	2899	2816	3	7	52	5	5	10	7.3	64000	80	50	100	200	30	21	80	35	25	15	20	45	10	15	9	3	3	3	3	80	0	2	200000
546	3711					4		0.001																									
548			3	7	52	3	8	23	12	128000	224	110	100	190	20	16	15	80	84							1	3	1	1	510	0	3	3000000
554	3523		1	4	52	2	2	0.6	0.5	1550	25	18	25	175	15	10	100	10	10	60	5	5	10	70	75	5	5	5	1	175	0	3	85300
555	3531		3	5	50	1	1	81	70	380000	0.5	0.3	100	150	100	100										3	3	3	3	0.8	0	3	60000
558	3531	3500	3	5	49	3	8	24	24	134396	280	181	100	100	150			50		15		3				3	3	3	1	501	0	3	560278
559	3500		2	5	49	3		22	15	123000	200	60	100	150	10	5	50	90	95							3	3	3	1	360	0	3	3382000
561	3531		3	5	50	4	4	25	15	130000	230	60	100	150	100	100										1	3	5	1	410	0	3	1250000
568	3700		2	5	50	3		16	11	55000	175	75	100	150	100	100										3	3	3	1	400	0	3	835870
570	3523		2	5	42	5	5	12	10	36000	240	200	100	175	10	10	8	90	90							1	1	3	1	340	0	3	3150000
578	3069		3	5	50	4	4	5	4	269030	60	17	100	220	50	50	100	50	50							3	3	3	3	140	0	3	1699790
580	3465		2	5.	50	3	8	13	10	70000	120	50	100	175	10	10	15	90	90							3	1	3	3	180	0	3	1200000
581	3011		3	7	50			20	12	96000	100	60	100	250	50	50	135	40	40	6	10	10				3	3	1	3	192	0	3	6000000
583	4961		3	7	52	4	8	12	8.5	48698	180	75	100	125	100	100										1	1	1	1	300	0	3	5595600
588	3522		1	5	46	5	5	9	6	23410	0	0	100	0												1		3		0	0	3	3810000
592	3011		3	6	52	3	8	15.5	8	91345	121	70.5	100	200	60	60	100	30	30	50	10	10				3	3	3	1	240	0	3	7800000
594	3391		2	5	48	3	8	4.1	4	10124	150	115	100	130	95	98	15	5	2							3	3	1	1	240	0	3	4651600
607	2013		3	7	52	4	4	5	3.9	33966	130	104	100	235	16	12	35	84	88							5	5	3	1	215	0	2	0
613	4900		3	7	52	3	9	19	11	93000	385	138	100	150	100	100										3	3	1	1	600	0	3	6415000
615	8221		3	7	52	2	2	9.3	7.7	43237	250	124	100	150	100	100										1	1	1	1	425	0	3	889225
623	3820	3499	2	5.	50			0.44	0.38	1205	0	0	100													2		2		2	0	3	118920
700	3200		3	7	52	3		4	2.5	18000	0	0	100													5		5		0	0	4	120000
701	2900	2800	3	7	52	10	6	85	77	675000	1800	1600	100	160	90	90	15	10	10							3	3	3	3	1950	0	3	60000000
702	2631		3	7	52	10	6																										
703			3	7	52																												
704			3	7	52	3	8																										
705			3	7	52																												
706			3	7	52																												
707	8221		3	7	52	3	8																										
708	7011		3	7	52	3	8																										
709	8221		3	7	52	4	12																										
710			3	7	52	3	7	1.2	1	5735	9	7	100	65	100	100										3	3	3	3	21	0	3	348550
711	8062		3	7	52	5	5																										
712	3211		3	7	52		8																										
713						1																											
714	3500		1.	5	50	5	5	8.9	8.2	39120	80	30	100	15	100	100										5	5	5	1	0	0	13	2323780
715	3679		1	5	52	3	8	0.6	0.5	120	0	0	100	25	100	100										1		3		0	0	3	
716	4924		3	7	52	3	8	1.4	1	9000	8	4	100	12	100	100										2	2	2	1	8	8	3	1350000

PLANT CODE NUMBER	UNI	F T2	FUEL2 QUANTITY	UNI	F T3	FUEL3 QUANTITY	UNI	COAL POSS	REASON NO 1	2	3	4	5	ELEC PROD	SYS TYP	YEAR INSTAL	CAP ELEC (MW)	PROD ANN (MWHR)	PROD PEAK (Klbs/hr)	PROD ANN (Klbs/yr)	QUANTITY FUEL	UNI	UTIL CON	EXP PLAN	GEN IN PAST	REASON DISCONTINUED	CONS COGEN
2	1	4	268000	2				1						1	1	1937	22	80000	212	1696000			1	1	1	Still operating	1
4	1							0		1				0											0		1
6	1							0	1					0											0		0
7	1							0	1				1	0											0		0
9	1	4	20000	4				1						0											0		1
15	1	9	117316	4				1	1					0											0	peak shaving only	1
19	1							1			1			0											0		1
24	1							0	1	1				0											0		0
25	1							0			1			1	3	1970	0.15		0	0	200	4	1	0	0		1
27														0											0		1
35	1							0			1			0											0		0
53	1	7	1200000	4				0	1				1	1	1	1951	12	10512	130	52500000	8000000	1	2	1	1	Still operating	
57	1							1						0											0		0
67	1	10	6760000	5				0					1	0											0		0
69	1							0	1		1			0											0		0
70	1							1	1		1			0											0		1
72	1	1	10325	4				0		1				0											0		0
77	1							0	1		1			0											0		0
80	1							1						0											0		1
82	1							0				1		0											1		0
84	1							1					1	0											0		0
85	1							0	1	1	1	1		0											0		0
89	1	2	2316	4	4	20526	2	1						1	1	1966	3	15000	33	170000	20526	2	2	0	1	Still operating	
91	1	1	6147	4				0	1		1			0											0		1
93	1							0	1	1	1			0											0		0
95	1	2	483000	4				0		1				0											0		1
98	1							0	1	1	1	1		0											0		0
101	1							0	1	1	1			0											0		0
103	1	1	30000	4	9	20000	4	1	1		1	1		0											0		1
110								0		1	1	1		0											0		0
111	1							1						0											0		1
115	1							1						0											0		0
116	1							1						0											1	Cheaper to buy	0
117	1							1	1					0											0		1
119	1	1	700000	4				0	1	1				1	3	1984	2	13000	0	0	700000	4	2	0	0		0
120	1	1	163236	4	4	12316	2	1						1	3	1967	12	56448	0	0	113000	4	3	0	1	Peaak shaving	1
124	2							1						1	1	1955	5	8700	55	221650	66000	2	2	0	1	Still operating	
130	1							0			1			0											0		0
133	3							1						0											0		0
135	1							0	1					0											0		0
140	1	2	800000	4				1	1					0											0		0
147	1							0	1		1			0											0		0
153	1							1	1		1			0											0		1
158	1	4	300000	2				1						1	1	1949	25	168000	540	3528000	300000	2	2	1	1	Still operating	1
160	1	1	3680	4				0					1	0											0		0
162	1							1						0											0		0
171	1							0	1		1			0											0		0

APPENDIX D: Plant Responses

PLANT CODE NUMBER	UNI	F T2	FUEL2 QUANTITY	UNI	F T3	FUEL3 QUANTITY	UNI	COAL POSS	REASON NO 1	2	3	4	5	ELEC PROD	SYS TYP	YEAR INSTAL	CAP ELEC (MW)	PROD ANN (MWHR)	PROD PEAK (Klbs/hr)	PROD ANN (Klbs/yr)	QUANTITY FUEL	UNI	UTIL CON	EXP PLAN	GEN IN PAST	REASON DISCONTINUED	CONS COGEN
178								1																	0		0
180	1	1	49000	4				0	1					0											0		0
181	1	1	500	4				1	1					0											0		0
186	1							0	1		1	1		0											0		1
188	1							1	1					0											0		1
193	1							0	1	1				0											0		0
197	1							0	1	1	1	1		0											0		0
204	1							0	1	1				0											0		0
209	1							0		1				0											0		0
210	1							0	1	1		1		0											0		0
211	1	2	109368	4	9	40600	4	0	1		1			0											0		0
215	1	1	150	4				0	1					0											0		0
216								1						0											0		0
219	1							0		1															0		0
223	1	2	11918	4				0	1	1	1	1		0											0		1
227	1							0	1	1	1	1		0											0		0
230								0	1		1			1	1	1922	10						2	0	1	Still operating	
241	1							1						0											0		1
244	1							0	1	1	1	1		0											0		1
247	1							0	1					0											0		0
252	1	1	30000	4										0											0		0
254	1							1						0											0		0
255	1							0	1	1	1	1		0											0		0
257	2							1						0											1	Cheaper to buy	1
264	1							0	1	1	1			0											0		1
269	1							0	1	1				0											0		0
277								0	1				1	0											0		1
280														1			2.7										
285	1							1						0											0		0
287	1							0			1			0											0		0
293	1	16	500000	4				0	1	1				0											0		1
295	1							1	1					0											0		0
303	4	3	30000000	1				0			1			0											0		1
313	1							0			1	1		0											0		1
317	1							0	1				1	0											0		1
319	4	3	57918510	1	16	94276680	1	0	1		1		1	1	1	1949	12	65000	1150	10500			2	0	1	Still operating	0
320	1							0	1	1	1			0											0		1
323																											
324	1							0		1				0											0		0
325								0	1	1				0											0		0
327	1							0	1	1				0											0		1
328	1							0	1	1				0											0		1
330	2							1						1	1	1984	3.5		120		60000	2	2	0	0		1
335	3	3	3.9E+11	3	16	1.8E+13	3	0	1	1				0											0		1
340								1						1	3		0.9	648	0	0	18000	4	2	0	1	Stand by	0
342	1	4	132.5	2										1	1	1940	12		550	325000	35000000	1	2	0		Still operating	
348	1							0	1	1	1			0											1	Outdated equipment	1

APPENDIX D: Plant Responses

PLANT CODE NUMBER	UNI	F T2	FUEL2 QUANTITY	UNI	F T3	FUEL3 QUANTITY	UNI	COAL POSS	REASON NO 1	2	3	4	5	ELEC PROD	SYS TYP	YEAR INSTAL	CAP ELEC (MW)	PROD ANN (MWHR)	PROD PEAK (Klbs/hr)	PROD ANN (Klbs/yr)	QUANTITY FUEL	UNI	UTIL CON	EXP PLAN	GEN IN PAST	REASON DISCONTINUED	CONS COGEN
351	1							1	1					0											1	Too expensive	1
357	1	15	3669000	1				0	1		1			0											0		1
359														1			4										
363	4	3	1455700	1				0			1			0											0		0
367	1							1																	0		0
370								0	1					0											0		0
373	1							0	1	1				0											0		1
376	1	2		4				0	1	1				0											0		0
378	1	9	80000	4				0	1	1	1			0											0		0
380	1							1	1					0											0		1
385	1							0					1	0											1	Steam vol.<turbo gen	1
386	1	1	29000	4	4	101900	2	1						1	3		0.6	14	0	0	600	4	1		1	Emergency power	1
389	1							1	1					0											0		1
391	1	14	360000	1				0				1		0											0		1
404	1	1	100000	4	4	220000	2							1	1	1948	14	91728	219	182500	220000	2	2	0	1	Still operating	1
411	2													0											0		1
414	1							0	1	1	1			0											0		1
415	1							0				1		0											0		0
419	1							0	1		1		1	0											0		0
421	1							1	1					1	1	1948	15		32	162240	2153850	1	1	0	1	Still operating	1
422	1							0	1	1	1	1	1	0											0		0
424	1							0	1	1		1		0											0		0
430	1							0	1		1			0											0		0
433	1													0											0		0
434	1							0	1		1		1	0											0		0
446	1							1					1	0											1	Discontinued in 1941	0
448	1							0	1	1				0											0		0
453	1							0	1			1	1	0											0		0
454	1							0	1					0											0		0
462	1							0					1	0											0		1
467	1							0		1				0											0		1
473	1							0	1	1				0											0		0
482	1							0	1	1		1		0											0		1
483	1							0	1		1			0											0		1
488	1							0	1	1	1			0											0		0
495	1							0		1	1			0											0		0
496	1	4	515900	2				1						1	1	1953	12	74670	1	1			1	0	1		
497	1							1	1					0											0		0
498														1			50										
500	1							0	1	1			1	0											0		0
505	1							0	1	1				0											0		0
507	1	2	114215	4				0	1	1				0											0		0
510	1	1	12000	4				0	1		1			0											0		0
511	1							0	1	1	1			0											0		0
512	1							0	1			1		0											0		0
513	1							0	1					0											1	Cheaper to buy	0
516	1							0	1	1		1		0											0		1

APPENDIX D: Plant Responses

PLANT CODE NUMBER	UNI	F T2	FUEL2 QUANTITY	UNI	F T3	FUEL3 QUANTITY	UNI	COAL POSS	REASON NO 1	2	3	4	5	ELEC PROD	SYS TYP	YEAR INSTAL	CAP ELEC (MW)	PROD ANN (MWHR)	PROD PEAK (Klbs/hr)	PROD ANN (Klbs/yr)	QUANTITY FUEL	UNI	UTIL CON	EXP PLAN	GEN IN PAST	REASON DISCONTINUED	CONS COGEN
521	1	2	50000	4				0	1	1	1			0											0		0
531	1							1	1					0											0		1
533	1							0		1	1	1		0											1	Cheaper to buy	1
537	1							0	1	1				0											0		0
544	1	1	5000	4				1						0											0		1
545	4	3	3400000	1				1						0											0		1
546																											
548	1	4	30000	2				1																	0		1
554	1	4	4150	2				1						0	1	1910	2	0	0	0			1	0	1	cheaper to purchase	1
555	1	2	70000	4	4	79000	2	1						1	3		2	160	0	0				0	0		1
558	1	4	31980	2	1	35018	4	1						0											0		1
559	1	4	18300	2				1						1	3	1970	8.8	30100	48	167300	4206700	1	1	0			1
561	1	4	28000	2	1	1100000	4	1						0											0		1
568	1	4	17000	2				1						0											0		1
570	1	4	49810	2				1						1	1	1928	10	18000	100	168000	1680000	1	2	1	1	Still operating	0
578	1							1						1	3	1955	0.55		0	0		4	1	0	1	Still operating	1
580	1	2	1100000	4	7	170505	4	1	1		1			0											0		0
581	1							0	1					0											0		1
583	1							0	1	1				0											0		0
588	1	1	100000	1	11	8.0E+10	3	0	1		1			0											0		1
592	1							1	1					0											0		0
594	1							0	1	1				0											1	Cheaper to buy	1
607	3	3	9155230	1				0	1		1			0											0		1
613	1	2	28856	4	4	22045	2	1		1	1			0											0		1
615	1	2	28856	4	4	22045	2	1						0											0		0
623	1							0		1				0											0		1
700	2							1						0											0		1
701	1	2	85000000	1				1						1	1	1943	20	60000					1	0	1	Still operating	1
702														1	1	1956	12.5	75000	330		140000	2	3	0			
703														1	1	1972	3.5	7582	40	200000	12825	2	1	0			
704														1	1	1971	5	12428	88	504620	6324792	1	1	0			
705														1	1	1947	2	7000	80	249688	14474	2	1	0			
706														1	1	1952	2	10000	59	342888	4317700	2	1	0			
707														1	3	1966	2.1	7000			1.0E+08	1	1	0			
708														1	3	1974	2	6000			90000000	1	1	0			
709														1	1	1960	30	61318	438	1956822	25000000	1	3	0			
710	1													1	3	1985	0.5	1500	2.4	91	180000	1	2	0			
711														1	3	1971	2.4	8819	10		2038179	1	3				
712														1	1	1955	31.9	56830		1511069			3	0			
713														1			90										
714	1							1						0											1	Particulate control	0
715	1							0	1		1			0											0		0
716	1							0		1				1	2	1963	1.4	9000	8	40000	1350000	1	1	1			

APPENDIX D: Plant Responses

PLANT CODE NUMBER	PLAN TO INST	WHEN	ELEC CAP (MW)	STEAM CAP (KLBS/hr)	REASON REJECTED 1	2	3	4	5	6	7	8	T1 DEGF	RATE1 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T2 DEGF	RATE2 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T3 DEGF	RATE3 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	% ROR
2	1	1	55	800									0																					0
4													1800	46000	2	1	0		0	2300	86000	2	1	1	1650	0								0
6										1			1000			1	0	1000	0															
7	0				1	1	1	1					0																					33
9	0					1							0																					20
15	1	1	1.3	0																														
19	0					1							0																					20
24	0				1								450	7380	2	3	1	300	0															0
25	1	5	5										0																					15
27	0				1																													
35					6					1																								
53													0																					0
57					1	1							0																					0
67	0												0																					0
69						1		1					0				1	350																100
70	1	4	4	50									485			2	0	485	0															0
72										1			0																					0
77					1	1	1			1	1		0																					0
80	0				1	1							0																					60
82	0					1					1		450	12000	2	2	0	450	0															0
84	0				1			1	1		1		0																					0
85						1				1	1		0																					33
89													0																					0
91	0												0																					20
93	0				1								0																					0
95					1			1		1			0																					-40
98	0												650	254500	1	1	0	650	0															0
101					1		1	1		1																								
103	0					1					1		0																					40
110					1		1						0																					0
111	0					1	1	1					0																					0
115	0												0																					0
116						1	1	1		1			0																					0
117	0				1	1	1				1		0																					0
119													0																					0
120	0					1							0																					20
124													0																					0
130					1					1			0																					0
133	0						1	1					0																					0
135	0				1								0																					0
140													0																					0
147	0				1		1			1	1		0																					0
153	0					1																												0
158																																		0
160										1						1	0		0															0
162	0																																	0
171	0					1							0																					0

APPENDIX D: Plant Responses

PLANT CODE NUMBER	PLAN TO INST	WHEN	ELEC CAP (MW)	STEAM CAP (KLBS/hr)	REASON REJECTED 1	2	3	4	5	6	7	8	T1 DEGF	RATE1 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T2 DEGF	RATE2 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T3 DEGF	RATE3 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	% ROR
178																																		
180						1				1			0																					30
181	0					1		1					0																					15
186	0				1		1			1	1		0																					33
188													0																					25
193					1	1	1					1					1																	0
197					1	1	1	1			1		0																					15
204													400	8000	2	2	1	250	0															0
209	0									1			0																					0
210													0																					0
211													0																					0
215										1			0																					0
216							1		1	1			0																					33
219	0		0.75	6	1								0																					15
223	1	2	0	0									0																					10
227										1			1800	417	2	1	1	400	0	600	333	2	2	1	330	0	800	117	2	2	1	150	0	30
230																																		0
241	1	2	3.2	60									900			1	0		0	900			1	0		0	900			1	0		0	0
244	0				1								0																					50
247										1			0																					0
252	0												0																					0
254					1	1				1			0																					0
255						1	1	1	1	1	1	1	0																					0
257	1	50											0																					0
264	0				1	1							0																					0
269						1							500	18000	3	3	0		0															0
277	0				1								405			2	0		0															33
280																																		
285	0				1		1	1					0																					25
287	0							1					0																					0
293	1	3	3										1600	3E+07	1	1	0		1	680	7000000	1	1	0		1	800	14000000	1	1	0		1	25
295						1							0																					15
303	0					1							2400	2666.6	2	1	1	1350	0	1330	2250	2	1	0		0	824	4750	2	1	0		0	50
313	1	3	2										410	4000	2	1	0		0	350	20000	2		0		1								0
317	1	1	5.4										450			1	0		0															35
319	0				1	1	1				1		0																					0
320	0					1	1	1					670	1E+08	1	1	1	473	1															19
323																																		
324	0									1			0																					0
325													0																					0
327						1	1	1					400			2	0	400	0															35
328	0					1	1	1					0																					35
330	1												0																					0
335	1	50											600	56200	3	1	0		0	640	160500	3	1	0		0	450	1413000	3	1	0		1	20
340	0				1								0																					0
342													425	400000	1	4	1																	14
348	1	50	0	0													1																	15

APPENDIX D: Plant Responses

PLANT CODE NUMBER	PLAN TO INST	WHEN	ELEC CAP (MW)	STEAM CAP (KLBS/hr)	REASON REJECTED 1	2	3	4	5	6	7	8	T1 DEGF	RATE1 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T2 DEGF	RATE2 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T3 DEGF	RATE3 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	% ROR
351	0				1	1	1																											0
357	1	3	3.7	18.3									0																					15
359																																		
363					1																													
367							1				1		0																					25
370													0																					0
373	0				1	1	1	1		1																								0
376						1							0																					0
378													700	10000	2	1	1	250	0	400	1200	2	1	1	150	0								0
380	0					1							1950	6E+07	1	1	1	400	0	510	1.4E+08	1	5	1	500	0	550	82000000	1	5	1	190	0	0
385	1	50											0																					25
386	1	50	8.6	38									650	62200	2	2	1	460	0	650	79800	2	2	1	460	0	650	81900	2	2	1	460	0	20
389	0					1							740	6	1	2	0	740	0															0
391	1	2	3	8									500				1	1	0															15
404	0				1	1				1		1	0																					0
411	1	50	10																															15
414	1	50											0																					0
415	0												1300	12000	2	2	1	500	0	1300	1200	2	2	1	500	0	1300	12000	2	2	1	500	0	0
419					1	1	1	1		1			0																					15
421													0																					0
422						1	1				1		500			2	0		0															18
424	0				1	1	1	1					0																					0
430					1	1	1			1	1		599	18200	2	1	0	599	1	540	31600000	3	1	0										0
433					1								0																					0
434					1	1	1			1	1		1750	12000	2	1	0		1	1750	12000	2	1	0		1	1750	12000	2	1	0		1	50
446					1	1				1	1		0																					20
448					1	1	1	1					0																					0
453										1																								
454						1							0																					15
462	0				1	1							0																					30
467	0				1																													15
473										1																								0
482	1	1	2.8	15										0																				25
483	1	2	7.5										0																					0
488					1	1	1	1	1	1	1	1	1200	4000	3	1	0		0															0
495																																		
496						1																												
497					1					1	1		1600			2	1	1000	0															0
498																																		
500						1							0																					0
505	0												0																					0
507							1	1		1	1		0																					0
510					1	1					1		0																					40
511						1					1		0																					
512										1			0																					0
513					1								0																					0
516	1	50											0																					30

APPENDIX D: Plant Responses

PLANT CODE NUMBER	PLAN TO INST	WHEN	ELEC CAP (MW)	STEAM CAP (KLBS/hr)	REASON REJECTED 1	2	3	4	5	6	7	8	T1 DEGF	RATE1 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T2 DEGF	RATE2 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	T3 DEGF	RATE3 FLOW	UNI	MAT	REC HT	FINAL TEMP DEGF	DRTY	% ROR
521													450			1	0		0															50
531	0					1	1	1					0																					0
533	0					1							450			1	0		0															0
537					1		1						1500			2	0		0	1500			2	0		0	700			2	0		0	0
544	0					1							800	180000	2	2	1	300	0															0
545	0					1																												0
546																																		
548	1	3											0																					0
554	0																																	
555	0				1	1				1			0																					0
558	0					1							0																					0
559													0																					0
561	0					1							0																					20
568	1	50											0																					0
570													1500	3000	2	2	0	1500	1															0
578	0					1							0																					15
580							1					1	450	30000	3	1	0		0															0
581	0					1																												
583					1								400	1700	3	2	1	375	0															
588	1	2	10				1						2200	5E+07	1	2	1	1200	1															35
592					1	1					1		425	27500	3	1	0		0	425	27500	3	1	0		0	475	44000	3	1	0		0	
594	1	50			1	1	1	1	1				0																					0
607	0				1	1					1						1		0					1		0					1		0	
613					1								0																					0
615										1			0																					0
623	0						1	1	1	1																								
700	1	2		100									1200	580000	3		0		0															25
701	0					1											1																	20
702																																		
703																																		
704																																		
705																																		
706																																		
707																																		
708																																		
709																																		
710																																		
711																																		
712																																		
713																																		
714													0																					0
715										1			0																					50
716																																		

PLANT CODE NUMBER	PYBK YR	B#AGE		T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#AGE		T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#AGE		T F
2	0	1	48	3		1				2	37	4		2				3	25	4		2				4	20	4		2				5	12	6
4	2	1	15	3	12400	1	135	115	100																											
6																																				
7	3	1	6	3	320000	1	150	85	50	2	6	3	320000	1	150	85	50																			
9	0	1	15	4	10000	2	150	150	49	2	15	4	10000	2	150	150	48	3	5	3	156000	1	150	150	3											
15		1	46	3	425685	1	165	100	25	2	46	3	425685	1	165	100	25	3	50	3	425685	1	165	100	25	4	51	3	425685	1	165	100	25			
19	2.5	1	29	3	4279750	1	250	170	85	2	37	3	503500	1	250	170	10	1	37	3	251750	1	250	170	5											
24	1.5	1	25	3	1100000	1	120	90	33	2	25	3	1100000	1	120	90	33	3	15	3	1100000	1	120	90	33											
25	2.5	1	5	3	387890	1	200	100	50	2	10	3	58183	200	100	50																				
27																																				
35	1	1	54	3	691270	1	150	75	22	2	54	3	848380	1	150	75	27	3	54	3	1602490	1	150	75	51											
53	0	1	44	6	4000000	1	600	560	50	2	44	6	4000000	1	600	560	50																			
57	1.5	1	9	3	110100	1	15	3	42	2	9	3	110100	1	15	3	42	3	9	3	37800	1	150	20	16											
67	3	1	3	3	2576190	1	350	280	45	2	6	10	2E+07	1	250	160	40	3	12	10	5037840	1	250	160	15											
69	1	1	21	3	350400	1	150	125	70	2	45	3	100000	1	100	40	15	3	45	3	100000	1	100	40	15											
70	2	1	33	8	950000	1	250	150	25	2	33	6	950000	1	250	150	25	3	33	6	1900000	1	250	150	50											
72	0	1	25	3	365	1	200	100	40	2	25	1	10000	4	15	12	60																			
77	1	1	30	3	4668	1	13	13	50	2	28	3	4200	1	20	10	25	3	28	3	4200	1	20	10	25											
80	2	1	20	6	4250000	1	220	220	50	2	18	6	4250000	1	220	220	50	3	0	4	0		400	400	0											
82	3	1	40	3	186000	1	20	8	52	2	45	3	61000	1	20	8	16	3	45	3	61000	1	20	8	16	4	45	3	61000	1	20	8	16	5	45	3
84	0	1	25	3	135	1	100	65	100	2	25	3	0	1	100	65	0	3	35	4	0		100	65												
85	0	1	25	3	229300	1	15	11	55	2	28	3	145900	1	15	11	35	3	14	3	41700	1	200	135	10											
89	0	1	37	8	2056	2	250	250	100	2	47	6	0		250	250	0																			
91	5																																			
93	0	1	4	3	250000	1	150	45	50	2	25	3	125000	1	150	45	25	3	25	3	125000	1	150	45	25											
95	2	1	21	6	2989007	1	200	175	34	2	11	6	2989007	1	300	175	33	3	11	6	2989007	1	300	175	33											
98	3	1	21	3	100	1	150	100	45	2	21	3	100	1	150	100	45	3	2	3	20	1	150	100	10											
101	2.5	1	12	6	266450	1	150	115	50	2	14	6	266450	1	150	115	50																			
103	0	1	15	3	160000	1	15	12	28	2	30	3	140	1	15	12	24	3	25	3	80000	1	15	12	14	4	25	3	120000	1	150	75	20	5	10	3
110	0	1	40	3			125	60		2	1	6			30	14		3	1	3			125	50												
111	0	1	20	6	7200000	1	200	160	50	2	20	6	7200000	1	200	160	50	3	20	6	0		200	160	0	4	20	6	0		200	160	0			
115	0	1	15	3	360000	1	270	150	100	2	15	3		1	270	150	0																			
116	0	1	6	6	114042	1	200	135	100																											
117	1	1	23	6	1820000	1	200	135	70	2	36	6	780000	1	200	135	30																			
119	2	1	5	3	600000	1	200	150	33	2	5	3	600000	1	200	150	33	3	5	3	600000	1	200	150	33											
120	0	1	8	8	10000	2	150	150	40	2	6	3	3600000	1	250	150	60																			
124	0	1	30	4	33000	2	600	600	50	2	30	4	33000	2	600	600	50																			
130	0	1	32	3	33451	1	10	10	40	2	32	3	33452	1	20	20	40																			
133	0	1	22	6	60000	3	125	75	100																											
135	0	1	27	3	150000	1	15	12	100	2	23	3		1	15	12	0																			
140	3	1	35	6	1500000	1	300	150	75	2	18	6	500000	1	300	150	25	3	48	6		1	300	150												
147	0	1	27	3	5600000	1	250	180	100																											
153	3	1	6	3	400000	1	200	140	100																											
158	0	1	38	4	100000	2	750	620	32	2	38	4	100000	2	750	620	32	3	33	4	100000	2	750	620	32	4	18	6	1560000	1	750	620	2	5	18	6
160	0																																			
162	2	1	11	3	40500	1	150	25	90	2	1	3	45000	1	15	10	10																			
171	3	1	22	3	19040	1	150	110	50	2	22	3	19040	1	150	110	50																			

APPENDIX D: Plant Responses

PLANT CODE NUMBER	PYBK YR	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F
178																																				
180	3																																			
181	0	1	19	6	275000	1	150	125	50	2	19	6	275000	1	150	125	50																			
186	3	1	4	3	732500	1	200	150	50	2	2	3	732500	1	200	150	50																			
188	0	1	41	3	1235000	1	430	250	5	2	11	6	65000	1	275	250	5																			
193	2	1	35	6	311138	1	250	100	50																											
197	9	1	15	3		1	150	7		2	7	3			150	35																				
204	0	1	39	6	616666	1	125	100	33	2	30	6	616666	1	125	100	33	3	30	6	616666	1	125	100	33											
209	0	1	20	3	215600	1		13	100																											
210	2.5	1	15	3	256000	1	125	50	74	2	46	3	110000	1	125	50	26																			
211	4	1	17	3	395000	1	475	400	50	2	17	3	3950000	1	475	400	50																			
215	0	1	15	3	52260	1	150	100	100																											
216	3	1	46	6	74500	1	15	12	31	2	46	6	74500	1	15	12	31	3	9	6	44500	1	15	12	19	4	6	6	44500	1	15	12	19			
219	0	1	20	6	375000	1	150	100	50	2	20	6	375000	1	150	100	50																			
223	0	1	20	6	2005	1	250	195	33	2	20	6	2007	1	250	195	34	3	20	6	2007	1	250	195	33											
227	5	1	16	6	3000000	1	225	160	50	2	14	6	3000000	1	225	160	50																			
230	2	1	60	6			250	200	60	2	24	6			250	200	20	3	24	6			250	200	20											
241	3	1	9	6	6000000	1	250	200	80	2	18	6	1500000	1	250	200	18	3	35	6	250000	1	250	200	1	4	35	6	250000	1	250	200	1			
244	5	1	26	6	323700	1	200	180	50	2	26	3	323700	1	200	180	50																			
247	2	1	16	3	20000	1	15	10	22	1	16	3	20000	3	15	10	22	3	15	3	17000	1	15	10	18	4	1	3	170000	1	15	10	18	5	6	3
252	4	1	25	6	100000	1	15	10	100	2	35	1			15	10	0																			
254	5	1	2	3	100000	1	15	10	40	2	2	3	100000	1	15	10	40	3	2	3	2000	1	15	10	8	4	2	3	3000	1	30	15	12			
255	0	1		3		1																														
257	3	1	60	4	4666	2	225	150	33	2	60	4	4667	2	225	150	33	4	60	4	4667	2	225	150	33	4	17	6		1	225	150	0	5	17	6
264	3	1	26	3	80000	1	15	14	25	2	26	3	80000	1	15	14	25	3	28	3	30000	15	14	50												
269	2	1	24	3	50000	1	190	175	50	2	24	3	500000	1	190	75	50																			
277	3	1	30	3		1		100	25	2	20	3		1		100	40	3	20	2		4		100	35											
280																																				
285	0	1	7	3	2310000	1	250	200	95	2	22	3	120000	1	250	200	5	3	22	3	0		250	200	0											
287	0	1	13	6	325000	1	150	100	50	2	16	6	325000	1	150	100	50																			
293	5	1	15	3	720000	1	325	300	20	2	15	3	720000	1	325	300	20	3	15	3	720000	1	325	300	20	4	6	3	2880000	1	325	300	80			
295	5	1	13	6	720000	1	150	125	100	2	13	6	0	1	150	125	0																			
303																																				
313	2	1	30	6	1800000	1	160	150	100	2	17	6		1	175	150	0																			
317		1	19	6	2500000	1	150	150	100	2	18	6		1	150	150		3	15	6		1	150	150												
319	0																																			
320	2	1	45	3	124228	1	30	10	50	2	45	3	124228	1	30	10	50																			
323																																				
324	0	1	10	6	33078	1	250	124	34	2	10	6	33078	1	250	124	33	3	25	6	33078	1	250	124	33											
325		1	11	3		1				2	11	3						3	4	3						4	6	3								
327	0	1	24	3	300000	1	250	165	60	2	32	3	80000	1	150	50	15	3	32	3	80000	3	150	50	15	4	21	3	50000	1	200	165	10			
328	0	1	22	3	125000	1	150	35	50	2	22	3	125000	1	150	35	50																			
330	0	1	1	4	60000	2	775	685	100	2	15	3		1	300	175	0	3	15	3		1	300	175	0	4	15	3		1	300	175	0			
335	3.5	1	14	1	2E+12	3	600	600	28	2	14	16	3E+12	3	600	600	40	3	14	6	2.5E+12	3	600	600	32											
340	0																																			
342	0	1	45	4	3180	1	650	600	22	2	4	37	660	1	650	600	24	3	37	4	7950000	1	650	600	23	4	37	4	15900000	1	650	600	23	5	49	3
348	2	1	25	6	539250	1	100	100	75	2	14	6	179750	1	100	100	25																			

PLANT CODE NUMBER	PYBK YR	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F
351	0.5	1	20	6	100000	1	450	450	10	2	6	6	100000	1	450	450	10	3	10	6	7000000	1	450	450	25	4				3						
357	0	1		6		1	250	100		2		15		1	250	100																				
359																																				
363	2	1	3	1	67150	1	15	10	60	2	38	2	4E+09	3	15	19	30	3	38	2	1.1E+08	3	15	10	10											
367	3	1	20	3	2250000	1	150	120	90	2	12	3	250000	1	250	150	10																			
370	3	1	28	3		1	150	125	100																											
373	0																																			
376	2	1	25	6	1E+07	1	250	240	20	2	5	6	1E+07	1	250	200	20	3	8	3		1	250	200	20	4	20	3	12840000	1	250	200	20	5	15	3
378	2	1	20	3	450000	1	160	35	75	2	20	3	150000	1	160	35	25																			
380	2.5	1	18	3	8E+09	1	600	600	17	2	17	3	8E+09	1	600	600	17	3	15	3	7.5E+09	1	600	600	17	4	10	3	7.5E+09	1	600	600	17	5	10	3
385	2	1	2	3	320000	1	150	135	80	2	1	3	80000	1	150	135	20																			
386	3	1	40	4	26500	2	450	150	26	2	37	4	37700	2	450	150	37	3	32	4	37700	2	450	150	37	4	16	3	177300	1	300	150	0			
389	0	1	18	6	94000	1	200	125	50	2	18	6	94000	1	200	125	50																			
391	0	1	20	6	720000	1	250	220	50	2	5	6	720000	1	250	220	50	3	1	13	360000	1	250	220	5											
404	4	1	25	4	100000	2	900	420	55	2	40	4	70000	2	600	420	22	3	40	4	70000	2	600	420	23	4	8	6		1	600	420	0			
411	0	1	35	4	38000	2	300	275	80	2	45	4	7000	2	150	150	15	3	10	3	370000	1	300	275	5											
414	0	1	40	3	2250000	1	125	120	50	2	25	3	2250000	1	125	120	50																			
415	4	1	8	3	0	1	100	30	90	2	17	3	6000	1	100	30	5	3	17	3	6000	1	100	30	5											
419	0	1	25	3	1000000	1	200	150	45	2	24			3	300	250	55																			
421	0	1	37	3	2153850	1	475	410	70																											
422	5	1	15	3	4000	1	300	250	99	2	16	3	600	1	300	250	1																			
424	0	1	25	3	228423	1	35	35	50	2	25	3	228423	1	35	35	50																			
430	2	1	15	3	1627700	1	350	240	100	2	9	6		1	350	240	0																			
433	0	1	30	3	206000	1	250	90	50	2	30	3	206000	1	250	90	50																			
434		1	43	6			150	150	6.7	2	43	6			150	150	6.7	3	43	6			150	150	6.7	4	43	6			150	150.	40	5	43	6
446	0	1	3	6	455000	1	200	150	50	2	3	6	455000	1	200	150	50	3	24	3		1	175	150	0											
448	2	1	1	3	495800	1	150	80	50	2	27	3	247900	1	15	15	25	3	27	3	247900	1	15	15	25											
453	3	1	20	3	474522	1	200	125	50	2	20	3	474522	1	200	125	50																			
454	0																																			
462	0	1		3	54000	1	50	15	100																											
467	2.5	1	29	3	76360	1	325	220	2	2	27	6	273910	1	325	220	6	3	23	3	1059940	1	325	220	24	4	13	6	1372880	1	325	220	31	5	23	3
473	0	1	44	3	155800	1	125	100	18	2	54	3	155800	1	125	100	18	3	54	3	155800	1	125	100	18	4	17	3	398158	1	150	100	46			
482	0	1	12	3	127038	1	35	15	70	2	12	3	54445	1	35	15	30	3	12	3	0	1	35	15	0	4	12	3	0	1	35	15	0			
483	30	1	25	6	336800	1	15	10	20	2	25	6	336800	1	15	10	20	3	25	6	336800	1	15	10	20	4	22	6	336800	1	15	10	20	5	22	6
488	3	1	20	3	770000	1	15	12	75	2	20	3	240000	1	15	12	25																			
495		1	27	3		1		150																												
496	2	1	32	12	310000	2	700	625	54	2	26	12	206000	2	700	625	36	3	7	17				625	4.8	4	32	17				300	3.6	5	20	17
497	1																																			
498																																				
500	2	1	10	6	30000	1	15	15	100																											
505	0	1	19	3	1200000	1	200	135	50	2	19	3	1200000	1	200	135	50	3	20	3	0	1	200	135	0											
507	1.5	1	27	2	114215	4	250	125	100																											
510	2.5	1		3	245000	1	225	120	40	2		3	245000	1	15	120	40	3		1	12000	4	225	120	2	4		3	110000	1	225	120	18			
511		1	25	3	175000	1	140	100	50	2	35	3	175000	1	135	100	50																			
512	5	1	18	3	120000	1	150	100	100																											
513	0	1	15	3	279093	1	100	100	50	2	15	3	279093	1	100	100	50																			
516	0	1	30	6	460000	1	250	140	34	2	30	6	460000	1	250	140	33	3	10	6	460000	1	250	140	33											

APPENDIX D: Plant Responses

PLANT CODE NUMBER	PYBK YR	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	B#	AGE	T F
521	2	1	30	6	750000	1	200	100	48	2	30	6	750000	1	200	100	49	3	30	2	50000	4	200	100	3											
531	2	1	25	3	2345600	1	250	150	80	2	17	3	439800	1	250	150	15	3	39	3	146600	1	200	150	5											
533	4	1	46	6	977190	1	250	150	61	2	40	6	346580	1	250	150	22	3	38	6	262250	1	250	150	18											
537	1	1		3	1939973	1	15	10	50	2		3	1939973	1	15	10	50																			
544	2	1	28	6			226	175	34	2	28	6			226	175	33	3	28	6			226	175	33											
545		1	15	6	1850000	1	300	285	50	2	15	6	1850000	1	300	285	50																			
546																																				
548	4	1	36	3	3000000	1	200	200	25	2	21	4	30000	2	200	200	70	3	36	3	0		200	200	0	4	36	3	0		200	200	0	5	25	3
554	3	1	36	4	0	2	250	175	0	2	36	4	4150	2	250	175	98	3	20	6	85300	1	250	175	2											
555	5	1	28	4	25000	2	150	150	25	2	28	4	25000	2	150	150	4	3	8	4	25000	4	150	150	25	4	8	4	25000	4	150	50	25			
558	0	1	28	4	10660	2	250	150	31	2	28	8	10660	2	250	150	31	3	28	8	10660	2	250	150	31	4	18	6	280139	1	250	1250	4	5	18	6
559	0	1	35	3	1920000	1	150	150	29	2	35	4	8535	2	150	150	25	3	35	4	9740	2	150	150	29	4	20	3	1470000	1	150	150	17			
561	5	1	32	4	8500	2	200	150	31	2	32	4	8500	2	200	150	31	3	23	4	11000	2	200	150	38	4	7	4	0		200	150	0	5	6	1
568	5	1	21	4	4250	2	200	150	25	2	21	4	4250	2	200	150	25	3	21	4	4250	2	200	150	25	4	21	3	835870	1	200	150	25			
570	2	1	27	12	6000000	1	600	600	60	2	38	12	4000000	1	175	175	36	3	45	6	500000	1	175	175	4											
578	5	1	13	6	832880	1	450	220	50	2	13	6	832880	1	450	220	50																			
580	0	1	33	6	400000	4	175	175	30	2	33	2	400000	4	175	175	20	3	2	33	400000	4	175	175	20	4	15	3	470000	1	175	175	30			
581	2	1	10	6	2000000	1	300	250	33	2	10	6	2000000	1	300	250	33	3	7	6	2000000	1	300	250	33											
583		1	20	3	1846548	1	250	125	33	2	20	48	1846548	1	250	125	33	3	10	3	1902504	1	250	125	34											
588	3																																			
592	2	1	22	6	1170000	1	250	230	15	2	22	6	1170000	1	250	230	15	3	18	6	2340000	1	250	230	30	4	11	6	3121000	1	250	230	40			
594	2	1	40	6	744260	1	150	130	16	2	40	6	744260	1	150	130	16	3	40	6	744260	1	150	130	16	4	30	6	2232770	1	150	130	52			
607	2	1	28	6	455560	1	250	235	5	2	14	6	455600	1	310	235	50	3	20	6	4100040	1	250	235	45											
613	2.5	1	34	6	3583800	1	225	150	56	2	27	6	1352664	1	225	150	26	3	6	6	1478536	1	225	150	18											
615	0	1		4	22045	2			78	2		6	933374	1			12																			
623		1		3	118920	1																														
700	4																																			
701	5	1	40	6	4E+07	1	650	600	31	2	30	6	4E+07	1	650	600	31	3	15	6	50000000	1	650	600	31	4	10	3	4000000	1	650	600	3			
702		1	38	4			475		40	2	28	4			475		40	3	10	6					10	4	10	6					10			
703		1	13	4			300	275	50	2	13	4			300	275	50																			
704		1	14	3			200	150	25	2	14	3			200	150	25	3	11	6			200	150	25	4	11	6			200	150	25			
705		1		4				250	45	2		4				200	45	3	4					250	5	4		4				250	5			
706		1	33	4			300	260	33	2	33	4			300	260	33	3	33	4			300	260	33	4	33	4			300	260	33			
707		1	19	3																																
708		1	20				60	40																												
709		1	13	3			300	175	20	2	13	3			300	175	20	3	13	3			300	175	20	4	29	2			900	150	20	5	23	2
710		1	25	6	116183	1	150	65	33	2	25	6	116183	1	150	65	33	3	25	6	116183	1	150	65	33											
711		1	14	3			100	50	50	2	14	3			100	50	50																			
712																																				
713																																				
714	0	0																																		
715	2	1	18	3				25	100																											
716		1	22	17	500000	1	15	12	40	2	22	17	500000	1	15	12	40	3	22	3	350000	1	15	12	20											

PLANT CODE NUMBER	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	ADDITIONAL INFO 1	2	3	4	5	6	ADDITIONAL COMMENTS
2		1				1	1	1	1	1	1	Gas usage is $75,000/ year.
4												Fuel type is purchased steam.
6												Boilers #1-5, refer to 10 seperate units.
7												Boilers used 35 min. every 4 hours.
9						1	1		1		1	
15						1			1	1	1	Steam demand too small to consider cogeneration.
19						1	1				1	
24									1			(Slop oil =135,000 BTU/gal.)
25						1	1		1		1	Each boiler capable of 100% steam load.
27												
35												Boilers #2 and 3 burn nat. gas and pitch.
53						1	1	1		1	1	
57												
67						1			1	1	1	
69												
70						1	1	1	1	1	1	
72												Steam used for space heating only.
77									1	1		Coal boiler too small, and expensive to operate.
80						1	1			1	1	
82	61000	1	20	8	16	1	1	1	1	1	1	(Coal at 11,000 BTU/lb.)
84												(Oil =134,000BTU/ Gal) No information on boilers.
85												
89							1				1	Boilers also use 483,000 gal resifual fuel oil.
91												
93												(LPG =21,500 BTU/LB) Boiler #1&2 are each two units combined.
95						1	1		1		1	
98									1		1	
101							1			1	1	Annual electric consumption is based on our estimate of their demand.
103	80000	1	15	12	14	1			1		1	
110												
111						1	1	1	1	1	1	
115												
116												
117												Demands are estimates based on annual el. consumption.
119							1		1		1	
120												
124												
130												
133												
135												Steam purchased from outside source.
140						1	1			1	1	
147												
153												Insufficient data supplied by respondent.
158		1	750	620	2				1	1	1	No process steam.
160												
162									1			
171						1	1		1	1	1	

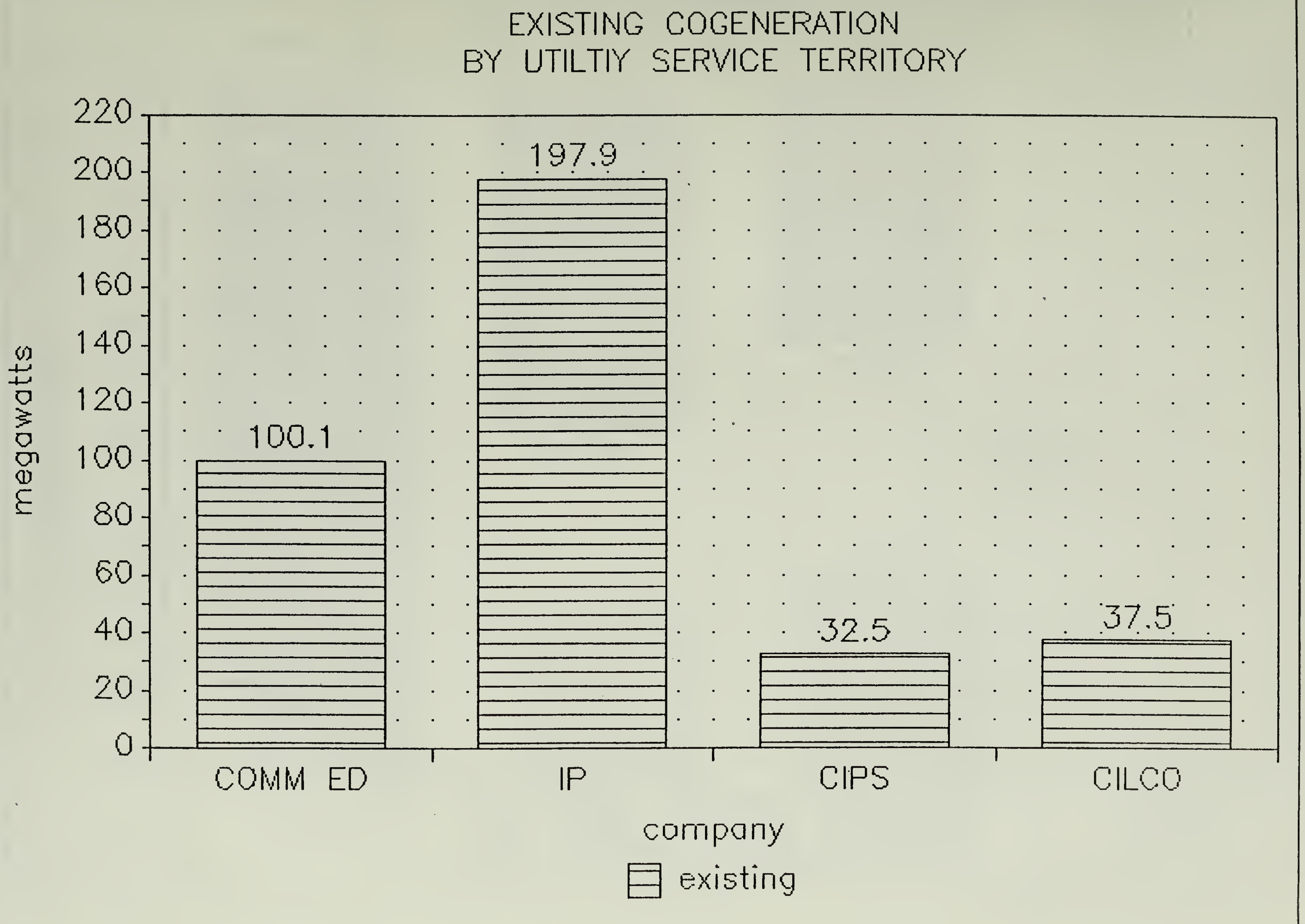
PLANT CODE NUMBER	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	ADDITIONAL INFO 1	2	3	4	5	6	ADDITIONAL COMMENTS
178												
180												El. and steam loads are estimated for 3 buildings.
181												
186						1	1	1	1	1	1	
188						1	1				1	
193												
197												
204												
209												
210												Each boiler capable of 100% of steam demand.
211												No information on fuel usage.
215												
216							1					
219							1					No process steam.
223							1		1	1	1	Steam for heat only.
227						1	1		1		1	
230							1				1	
241						1	1		1	1	1	
244						1			1	1	1	
247	17000	1	15	10	18							
252						1	1		1		1	Annual electric consumption is our estimate.
254						1	1		1	1	1	
255						1	1	1	1	1	1	
257		1	225	150	0	1	1	1	1	1	1	
264												Coal constraint- located in residential neighborhood.
269						1						Boilers run 4 months/year.
277							1	1				Respondant stated that co. policy would not allow survey to be completed.
280												
285							1					
287												
293							1	1	1	1	1	Boilers #1 & 4 also burn creosote (150,000 BTU/gal.)
295												Boilers labeled #4 & 5 are each two boilers.
303						1	1	1	1	1	1	Purchases all steam from utility
313						1	1		1	1	1	
317						1	1	1	1	1	1	
319												Add fuel- Petroleum coke 1,756,528 MMBTU. Boilers labeled #4 & #5 are each two boilers
320												
323												
324						1						No process steam.
325												
327						1	1		1	1	1	
328						1	1		1	1	1	
330												Boiler #1 is four units combined.
335						1	1				1	Currently investigating cogeneration
340												Boiler #3 is not yet in service.
342	6600000	1	650	600	20							
348						1	1	1	1	1	1	

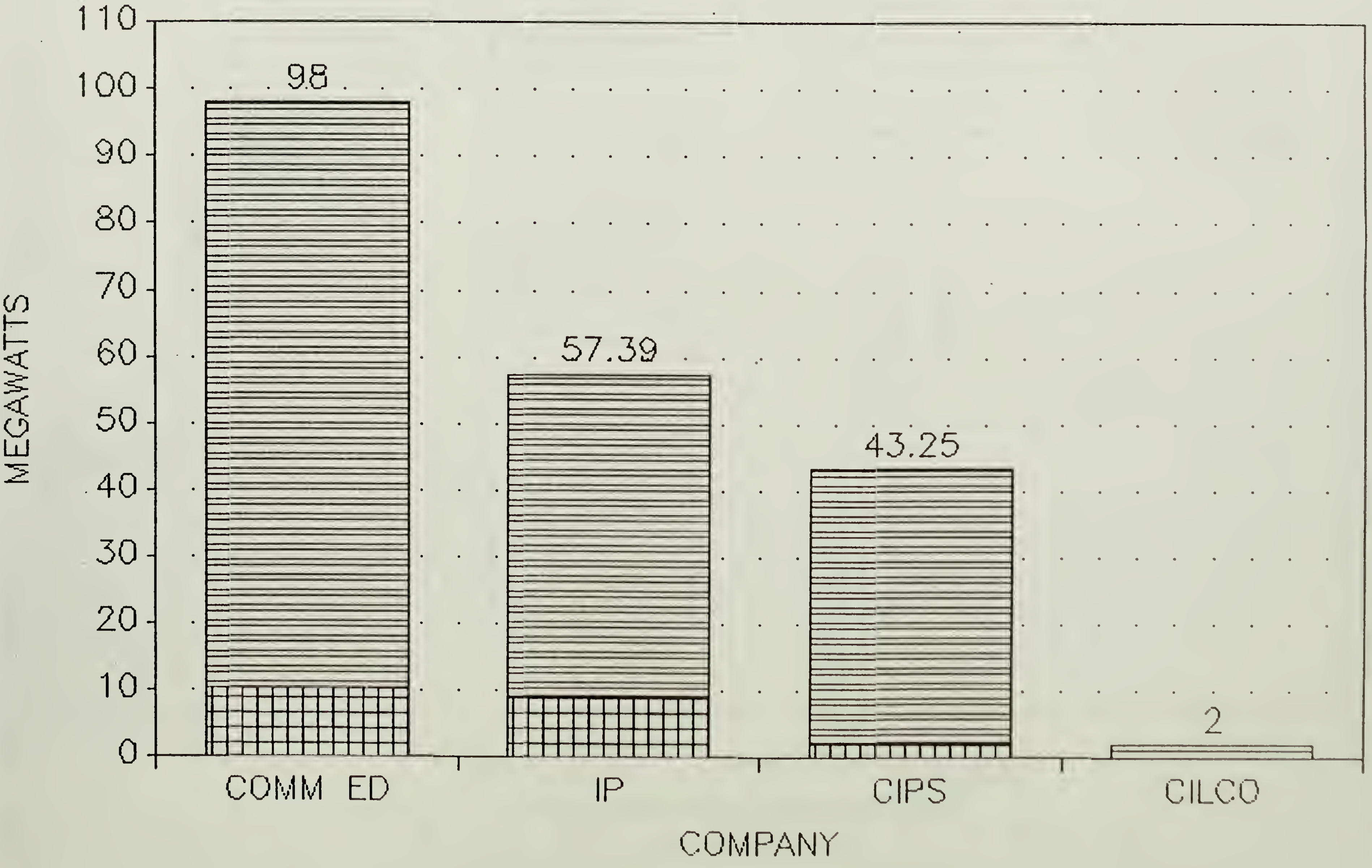
PLANT CODE NUMBER	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	ADDITIONAL INFO						ADDITIONAL COMMENTS
						1	2	3	4	5	6	
						ADDITIONAL INFO						
351							1				1	
357												Cogen. has not been evaluated. #3 waste heat stream goes through boiler.
359												
363						1				1		
367						1			1			
370												
373										1		
376	12840000	1	250	200	20	1	1	1	1	1	1	Coal usage would require delivery by truck.
378												
380	1.3E+10	1	600	600	32		1				1	No steam boilers.
385						1	1		1	1	1	No process steam.
386						1			1	1	1	
389												
391						1			1	1	1	
404												
411						1	1		1		1	
414												
415						1	1				1	Boilers to be shut down permanently in 1985.
419												Only 1/2 of plant operating.
421												Low pressure steam for tank heating and line tracing only.
422						1	1		1		1	Boiler #1 are several units combined.
424												
430												
433						1						
434			150	150	40							Handling cost of coal too high
446												
448						1	1	1	1	1	1	
453												
454												
462							1				1	
467	1688160	1	250	220	38	1			1		1	Peak electric value is our estimate.
473										1		Plant is not yet in operation.
482						1	1	1		1	1	
483	336800	1	15	10	20	1	1	1	1	1	1	
488						1	1	1	1	1	1	
495							1			1	1	
496				65	1.3							Boiler #1 is 3 boilers, boiler #2 is 2 boilers, boiler #3 is 5 boilers
497						1					1	
498												Boilers #2 & 3 are each two units combined.
500												
505										1	1	No process steam.
507												
510						1	1	1	1	1	1	No information on boilers.
511												
512						1	1					Boiler #1 also burns 3,584,053 gal.,#2- 1,816,237 gal.
513									1			Boilers #1 & 2 are each 3 units combined.
516						1	1		1	1	1	

PLANT CODE NUMBER	FUEL ANNUAL	UNI	RATE PSIG	AV PSIG OPER	% AV DEM STM	ADDITIONAL INFO						ADDITIONAL COMMENTS
						1	2	3	4	5	6	
						ADDITIONAL INFO						
521						1	1		1		1	Boiler #1 is 5 units, #2 is 2 units.
531						1						
533						1	1		1			
537						1	1				1	
544												
545						1				1	1	
546												Produces hot water
548	0		200	200	0	1	1	1	1	1	1	Produces hot water info scarce
554							1					
555												
558	280139	1	250	150	3	1	1					Steam for heat & AC
559						1						May discontinue cogeneration
561	0		260	150	0	1	1	1	1	1	1	
568							1				1	
570						1	1		1	1	1	
578						1	1					
580						1	1		1	1	1	
581												
583												
588							1	1	1		1	
592												
594						1	1	1				
607						1	1				1	
613						1	1		1	1	1	
615												
623							1		1		1	Boiler used for heating only
700						1	1	1			1	
701												
702												
703												
704												
705												
706												
707												
708												
709			900	200	20							
710						1	1	1	1	1	1	
711												
712												
713												
714							1		1	1	1	
715												
716							1	1	1	1	1	

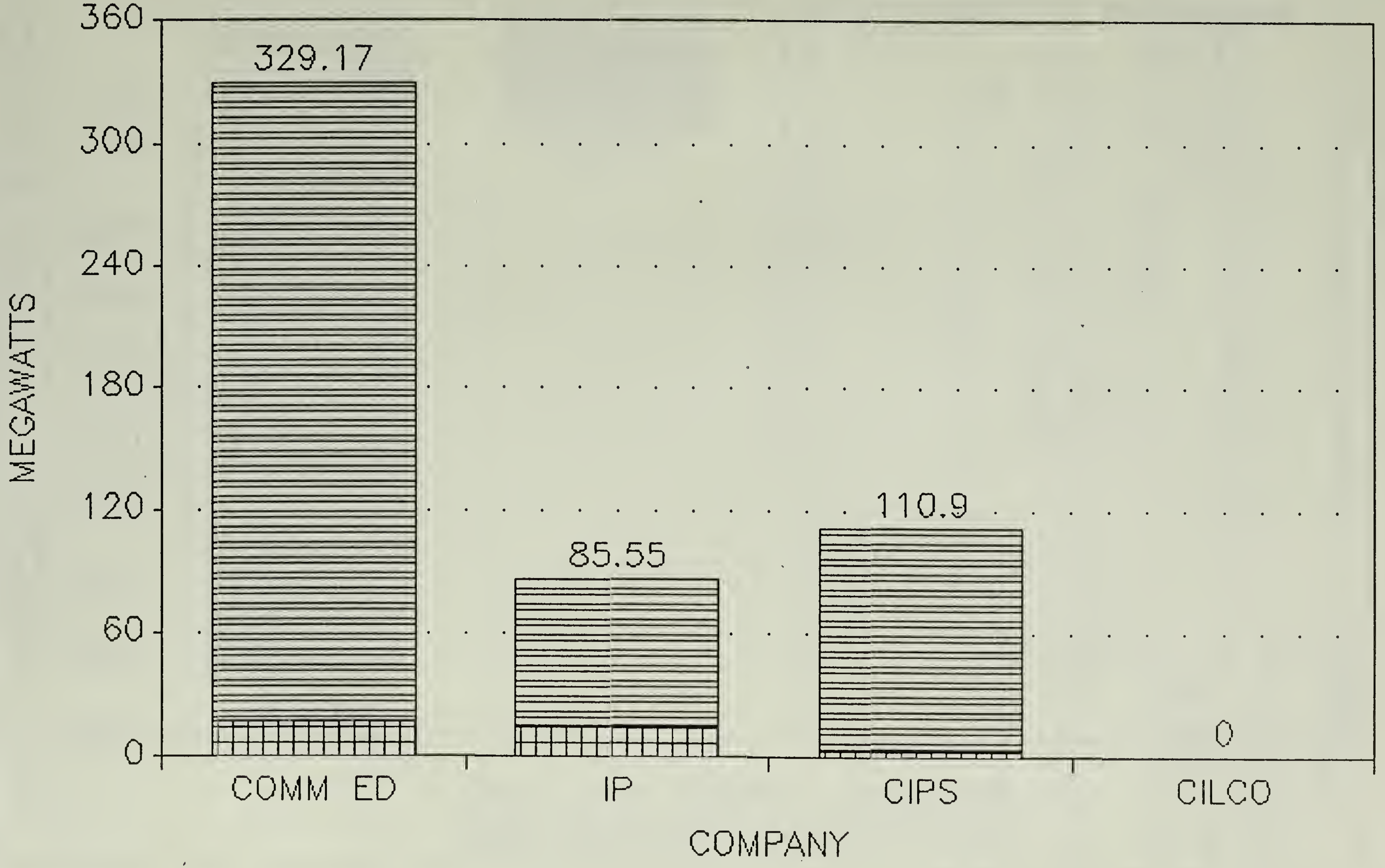
APPENDIX E

POTENTIAL AND EXISTING COGENERATION BY UTILITY TERRITORY


EXISTING COGENERATION
BY UTILTIY SERVICE TERRITORY
megawatts
220
200
180
160
140
120
100
80
60
40
20
0
100.1
197.9
32.5
37.5
COMM ED
IP
CIPS
CILCO
company
existing

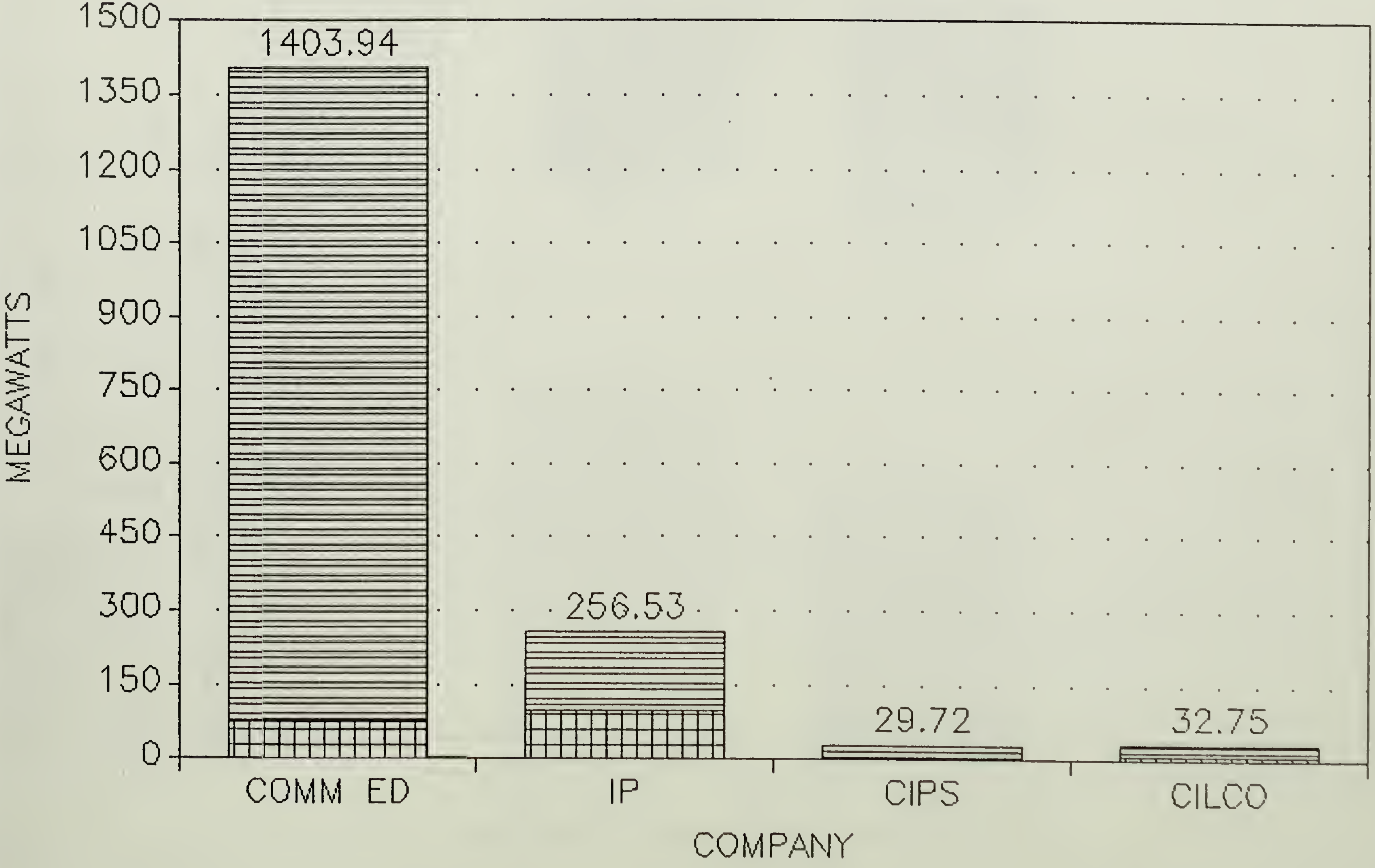


LOW COGENERATION POTENTIAL
BY UTILITY SERVICE TERRITORY



MEDIUM COGENERATION POTENTIAL
BY UTILITY SERVICE TERRITORY

HIGH POTENTIAL COGENERATION
BY UTILITY SERVICE TERRITORY



50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. RE-AQ-86101	2.	3. Recipient's Accession No.

4. Title and Subtitle

An Evaluation of the Technical Potential for Cogeneration in Illinois

5. Report Date

January 1986

6.

7. Author(s)

Shawn T. Couglan, Lee Parker and Dilip R. Lemaye

8. Performing Organization Rept. No.

9. Performing Organization Name and Address

Synergic Resource Corporation
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10. Project/Task/Work Unit No.

85/3109

11. Contract(C) or Grant(G) No.

(C)

(G)

12. Sponsoring Organization Name and Address

Illinois Department of Energy & Natural Resources
325 West Adams
Springfield, IL 62704

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The study evaluates the technical potential of cogeneration in Illinois by technology, capacity and utility service territory.

17. Document Analysis a. Descriptors

Cogeneration

b. Identifiers/Open-Ended Terms

Cogeneration

c. COSATI Field/Group

18. Availability Statement No restriction on distribution. Available at Illinois depository libraries or from National Technical Information Services, Springfield, VA 22161	19. Security Class (This Report) Unclassified	21. No. of Pages 120
	20. Security Class (This Page) Unclassified	22. Price

(See ANSI-Z39.18) See Instructions on Reverse

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